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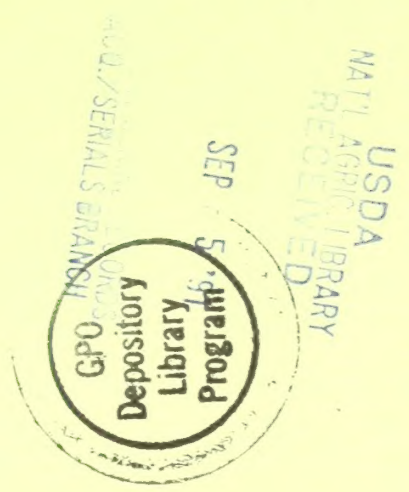
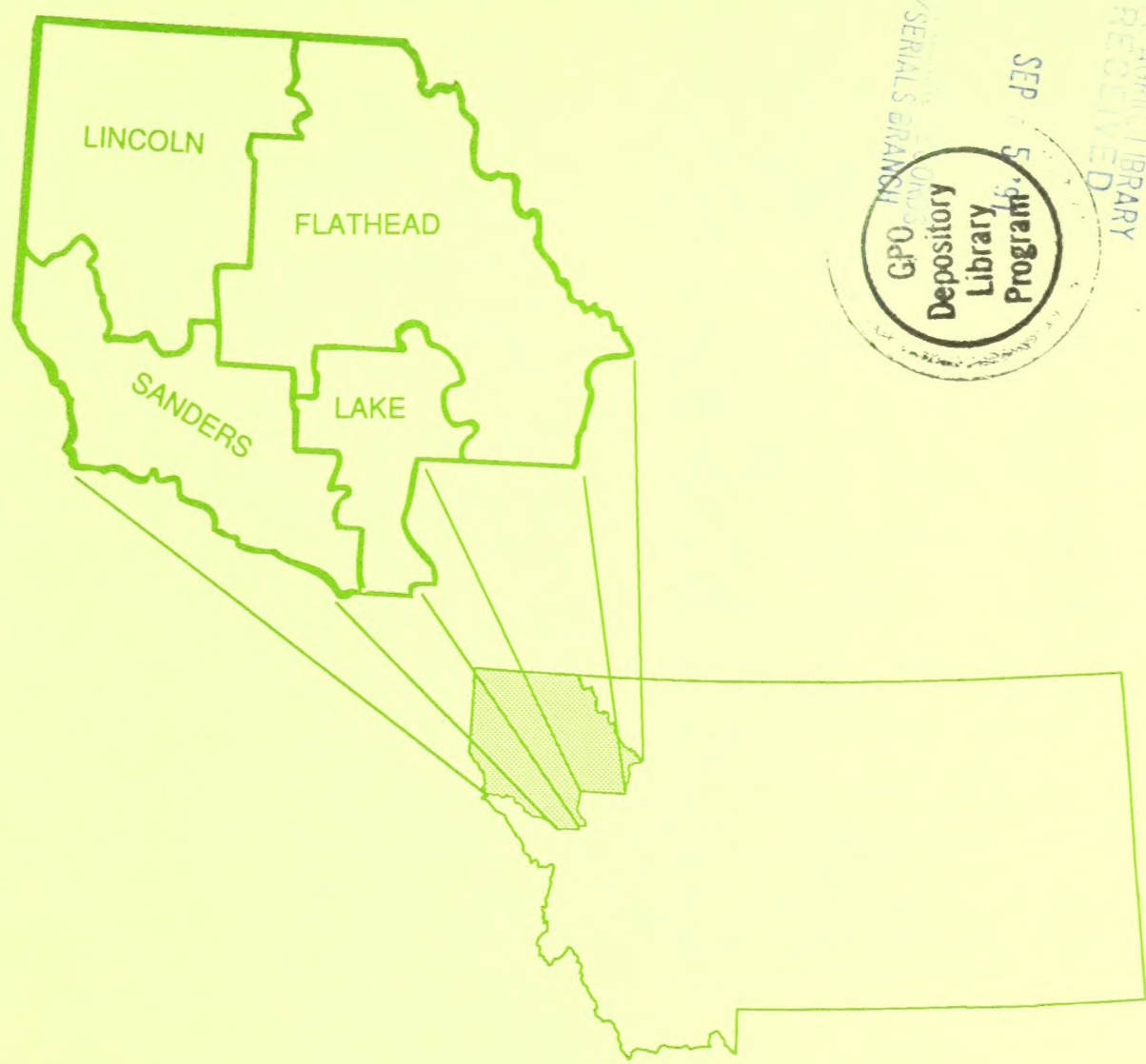
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Forest Statistics for Land Outside National Forests in Northwestern Montana, 1989

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RESEARCH SUMMARY

There are about 2.4 million acres of forest land outside the National Forests in northwestern Montana, all of it timberland. Of the 1.9 million acres of non-reserved timberland 1.6 million (85 percent) are privately owned. The estimated volume of wood on these lands is nearly 3 billion cubic feet; net annual growth in 1988 was about 78 million cubic feet. This report highlights additional information on total land area, timberland area, volume, growth, and mortality.

PREFACE

The primary objective of Forest Survey—a continuing, nationwide undertaking of the Forest Service, U.S. Department of Agriculture—is to provide an

assessment of the renewable resources for the forest lands of the Nation. Fundamental to the accomplishment of the objective are the periodic State-by-State resource inventories. Originally, Forest Survey was authorized by the McSweeney-McNary Act of 1928. The current authorization is through the Renewable Resources Research Act of 1978.

The Intermountain Research Station with headquarters in Ogden, UT, conducts the forest resource inventories for the Rocky Mountain States of Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, and Wyoming. These inventories provide information on the extent and condition of the forests—their volume of wood and stand dynamics as expressed by growth, removals, and mortality for State, privately owned, and most other forest lands not in the National Forest System. These data, when combined with similar information on National Forest lands, provide a basis for forming forest policies and programs and for the orderly development and use of the resources.

ACKNOWLEDGMENTS

The Intermountain Research Station gratefully acknowledges the cooperation of the Montana Department of Lands, Forestry Division, the Bureaus of Land Management and Indian Affairs, U.S. Department of the Interior, and the Northern Region, Forest Service, U.S. Department of Agriculture. We extend a special note of gratitude to Gary Brown, Montana State Forester, and his staff; and the private land owners who provided information and access to field sample locations.

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INTRODUCTION

This report presents the principal findings of the most recent Forest Survey of the timberland resources outside the National Forests in northwestern Montana (fig. 1). Phase I of the survey began in 1987 with the collection and reconciliation of area information and aerial photo interpretation. The field phase began in 1988 and was completed in 1989.

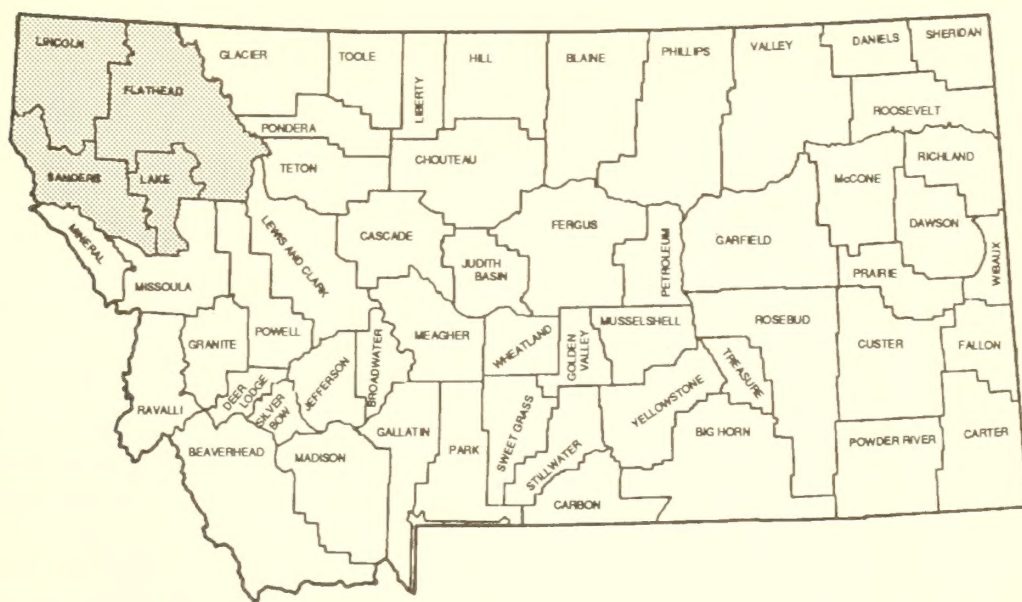


Figure 1—Northwestern Montana Counties.

The resource statistics in this report include estimates for those lands in private ownership and those public lands administered by the Bureau of Land Management (BLM), U.S. Department of the Interior (USDI), other Federal agencies, the State of Montana, and county and municipal governments. Reserved areas, such as those lands administered by the National Park Service, USDI, are not field sampled but are included in the total area summaries (table 1). Area estimates for those lands administered by the National Forest System, Forest Service, U.S. Department of Agriculture, are also included in table 1. However, associated resource estimates are not included in this report but will be combined with the estimates

presented here and in other Survey Unit reports to form the basis for a comprehensive statewide analysis of Montana's forest resource situation.

HIGHLIGHTS

Area

The four counties in northwestern Montana contain 8.5 million acres. The majority of the land—56 percent—is in National Forests (fig. 2). Of the 2.7 million acres of private land, forest industry owns 31 percent.

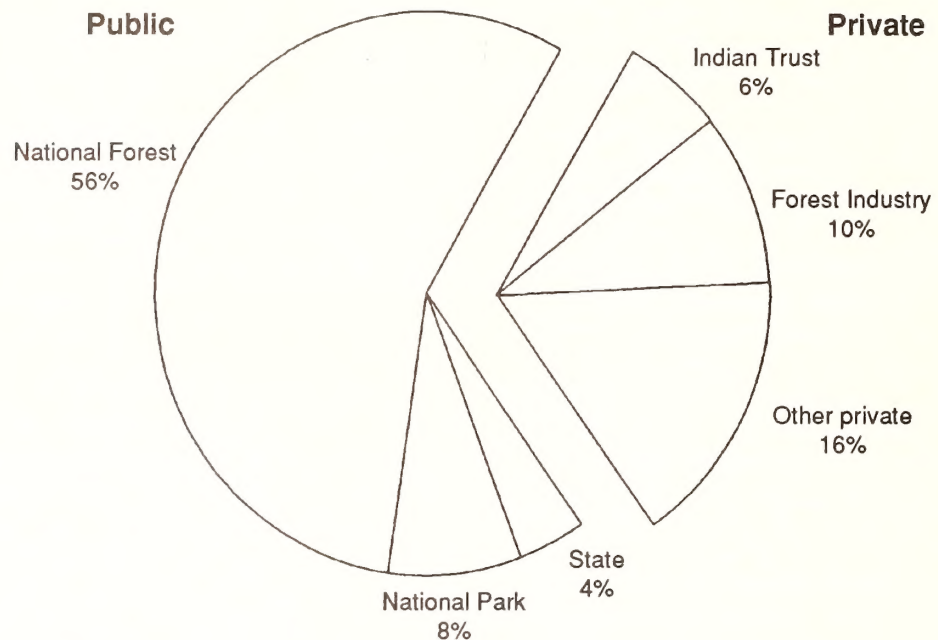


Figure 2—Distribution of land area by ownership in northwestern Montana, 1989.

There are 3.7 million acres of land outside the National Forests in northwestern Montana. More than 2.4 million—66 percent—meet minimum stocking requirements to be classified as forest land, and all of it is timberland (fig. 3).

About 500,000 acres or 21 percent of the forest land is reserved, much of which is in Glacier National Park. Little of the 1.7 million acres of timberland in private holdings is reserved from timber harvest.

Nonreserved timberland in northwestern Montana is principally in the hands of two owner groups, and in nearly equivalent proportions. Forest industry owns about 806,000 acres, or 42 percent of the timberland area. Nonindustrial private timberland amounts to nearly 817,000 acres—43 percent. Timberland in other public ownership totals just over 292,000 acres and includes State and Bureau of Land Management (BLM) lands.

Stands in which Douglas-fir (*Pseudotsuga menziesii*) and lodgepole pine (*Pinus contorta*) predominate constitute almost two-thirds of the non-reserved timberland area (fig. 4). The Douglas-fir, lodgepole pine, ponderosa pine, and western larch forest types together total 1.6 million acres, or 81 percent of timberland. Other forest types occurring include western hemlock, western redcedar, grand fir, spruce-fir, Engelmann spruce, aspen, and cottonwood.



Figure 3—Distribution of land area outside National Forests by type of land in northwestern Montana, 1989.

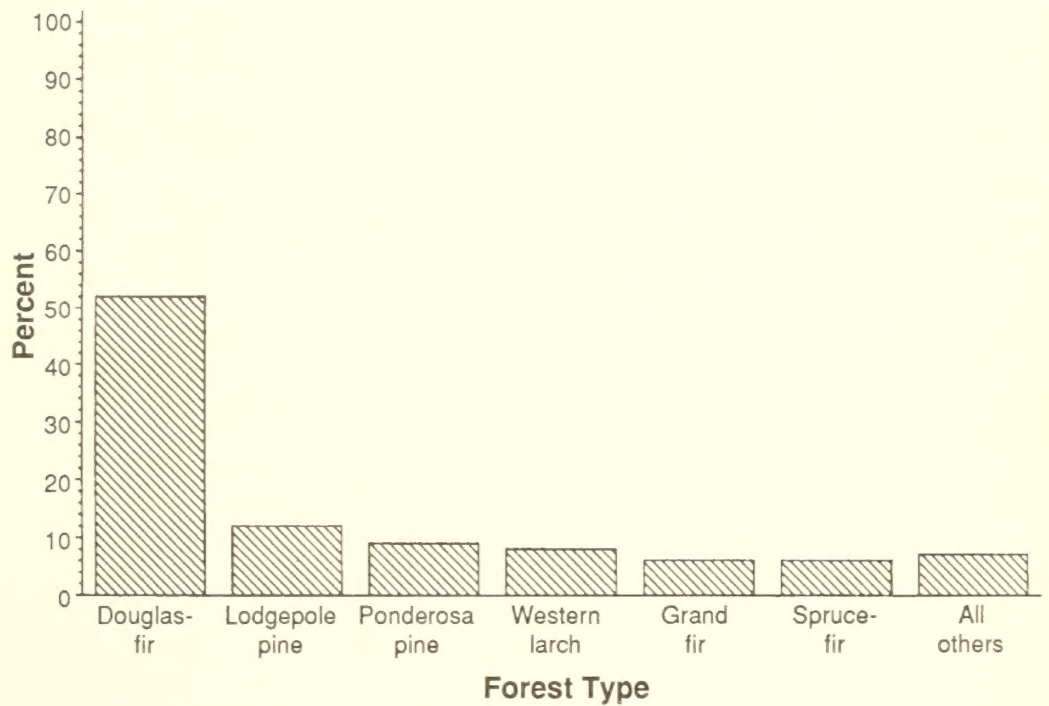


Figure 4—Distribution of timberland area outside National Forests by forest type in northwestern Montana, 1989.

The distribution of the timberland area by stand-size class gives some indication of the kinds and sizes of forest products potentially available for harvest. Sawtimber stands occupy over half of the timberland area (fig. 5), with poletimber and sapling/seedling stands each occupying roughly one-fifth of the timberland. Only 2 percent is currently nonstocked, most of which is forest industry owned.

A large portion—45 percent—of the sawtimber stands are on nonindustrial private land, as is about 55 percent of the timberland area in the poletimber stand-size class. The 470,554 acres of nonindustrial private sawtimber represents about 58 percent of the timberland area within this owner group. Another 238,048 acres—29 percent—are classified as poletimber, and 93,774 acres—11 percent—are stocked with sapling/seedling stands.

The distribution of the forest industry owned timberland by stand-size class differs considerably. About 35 percent of the total area in sawtimber stands is owned by forest industry, as well as an equal proportion of the total acres of poletimber. But sawtimber stands are present on just 45 percent of the industry land, and only 19 percent is stocked with poletimber. A full third—266,620 acres—are currently stocked by sapling/seedling stands. This accounts for 66 percent of the total timberland area within this stand-size class. Although only 4 percent of the forest industry

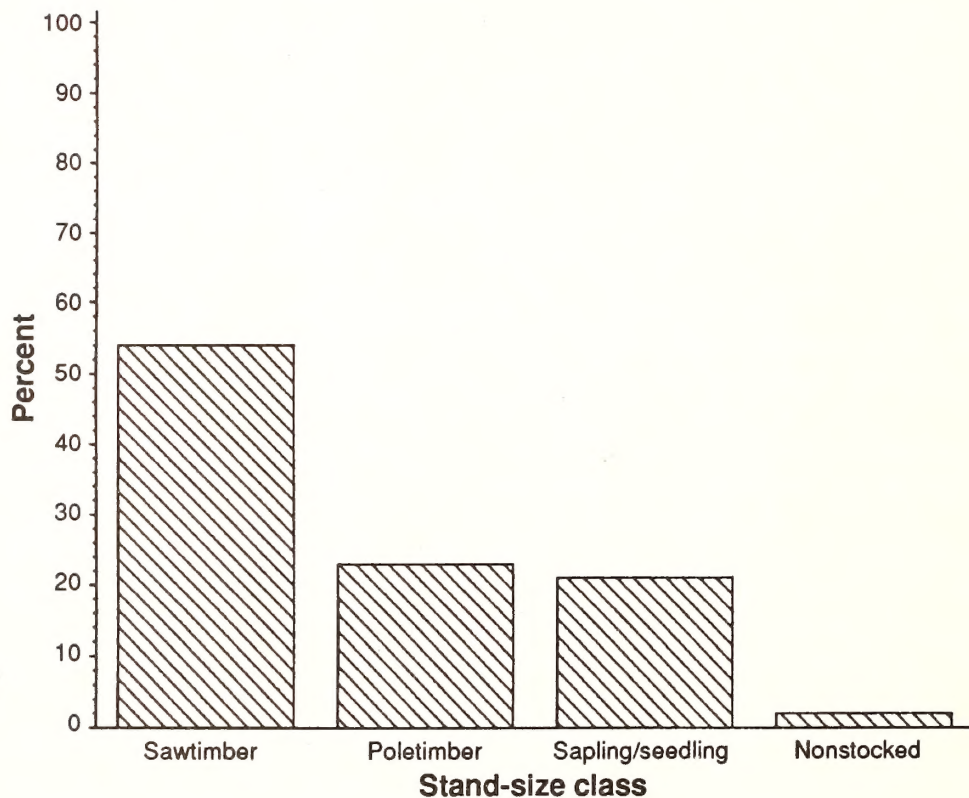


Figure 5—Distribution of timberland area outside National Forests by stand-size class in northwestern Montana, 1989.

timberland is nonstocked, the 31,011 acres represents about two-thirds of the total nonstocked timberland area:

Stand-size class	Forest industry	Nonindustrial private
	----- Acres -----	
Sawtimber	359,322	470,554
Poletimber	149,319	238,048
Sapling/seedling	266,620	93,774
Nonstocked	31,011	14,321

A total of 71 percent of the other public timberland is classified as sawtimber, and equal amounts—14 percent—are in the poletimber and sapling/seedling stand-size classes.

An estimate of board-foot volume per acre can be a rough indicator of harvest potential. Of the timberland acres, 61 percent supports stands containing, on the average, less than 5,000 board feet per acre (fig. 6). Of the timberland area, 30 percent contains less than 1,500 board feet per acre, while 19 percent supports stands containing 10,000 or more board feet per acre.

All of the timberland acres are capable of producing 20 cubic feet of wood fiber or more per acre on an annual basis. Just over one-quarter of the area is capable of producing 85 or more cubic feet per acre per year.

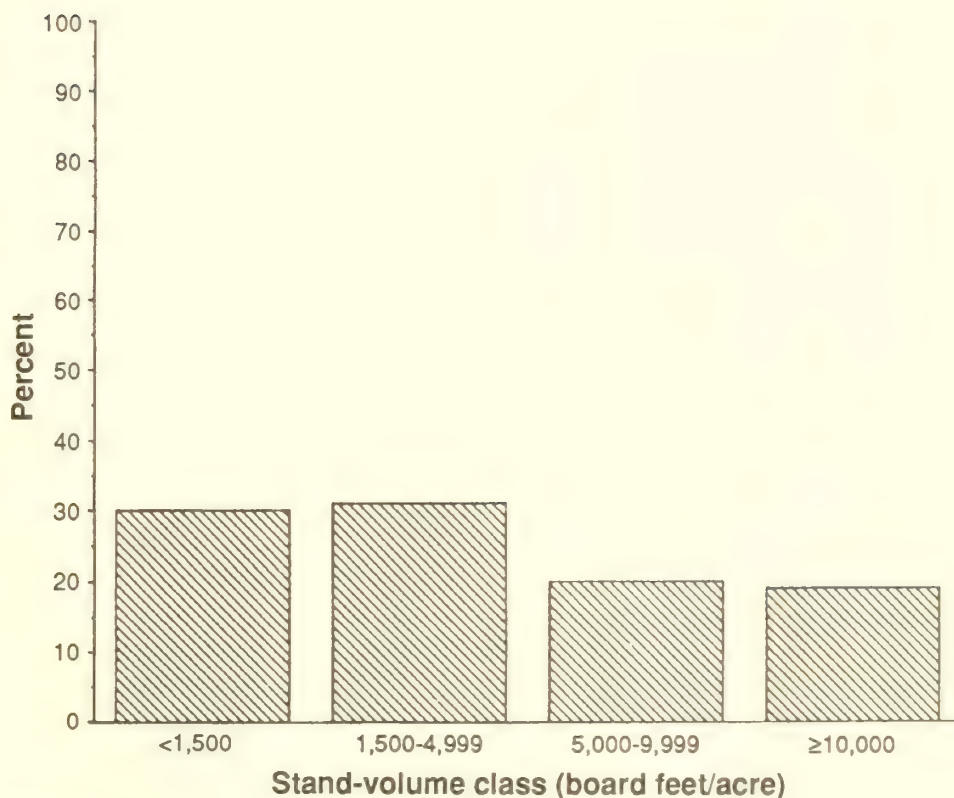


Figure 6—Distribution of timberland area outside National Forests by stand-volume class in northwestern Montana, 1989.

Stand Composition and Volume

The timberlands of northwestern Montana contain almost 842 million growing-stock trees. Most are coniferous species, with just over 5 percent aspen (*Populus tremuloides*) and cottonwood (*Populus* spp.). More than two-thirds are less than 5.0 inches diameter at breast height (d.b.h.), and only 10 percent are sawtimber-sized trees (fig. 7). In addition to the growing-stock trees, timberland stands contain more than 7.3 million cull trees, and they are almost equally divided between rough culls and trees with more than two-thirds of their volume in rotten and missing wood. There are another 31 million trees that are dead but still sufficiently sound to meet minimum merchantability standards.

About 80 percent of the timberland acres are less than fully stocked, and 2 percent, 47,359 acres, are nonstocked (fig. 8). The 383,245 acres in the fully stocked and overstocked conditions are at full stocking with growing-stock trees, but cull trees are present in sufficient number to create the overstocked condition on about 6 percent of the timberland area. Mature stands, where trees in excess of 100 years old make up the majority of stocking, occupy 323,140 acres.

Timberland supports 2.9 billion cubic feet of growing stock, including 11.1 billion board feet (International 1/4-inch rule) of sawtimber. The volume in rough and rotten cull trees and salvable dead trees adds an additional 209 million cubic feet to the timberland "woodpile."

Sawtimber stands contain more than 86 percent of the board foot volume on timberland. Poletimber and sapling/seedling stands account for 10 percent and 3 percent, respectively.

Roughly two-fifths of the growing-stock and sawtimber volume is on nonindustrial private timberland. Forest industry has 36 percent, and other public timberlands account for the remainder.

On the average, volume per acre is about 4,824 board feet per acre (Scribner) over all owners. Volume is lowest for forest industry lands—

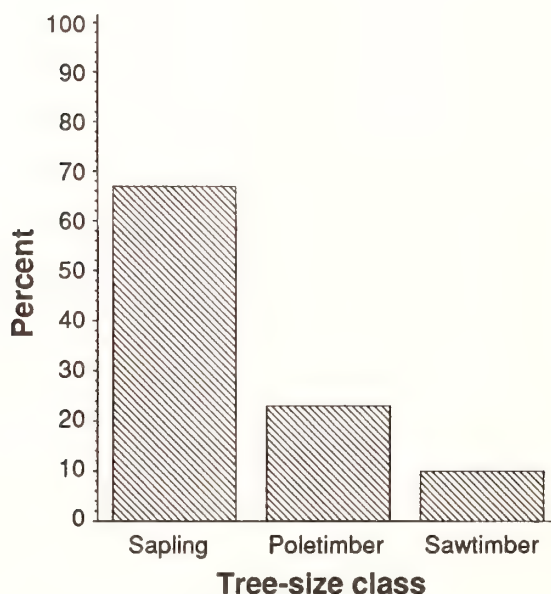


Figure 7—Distribution of growing-stock trees on timberland outside National Forests by tree-size class in northwestern Montana, 1989.

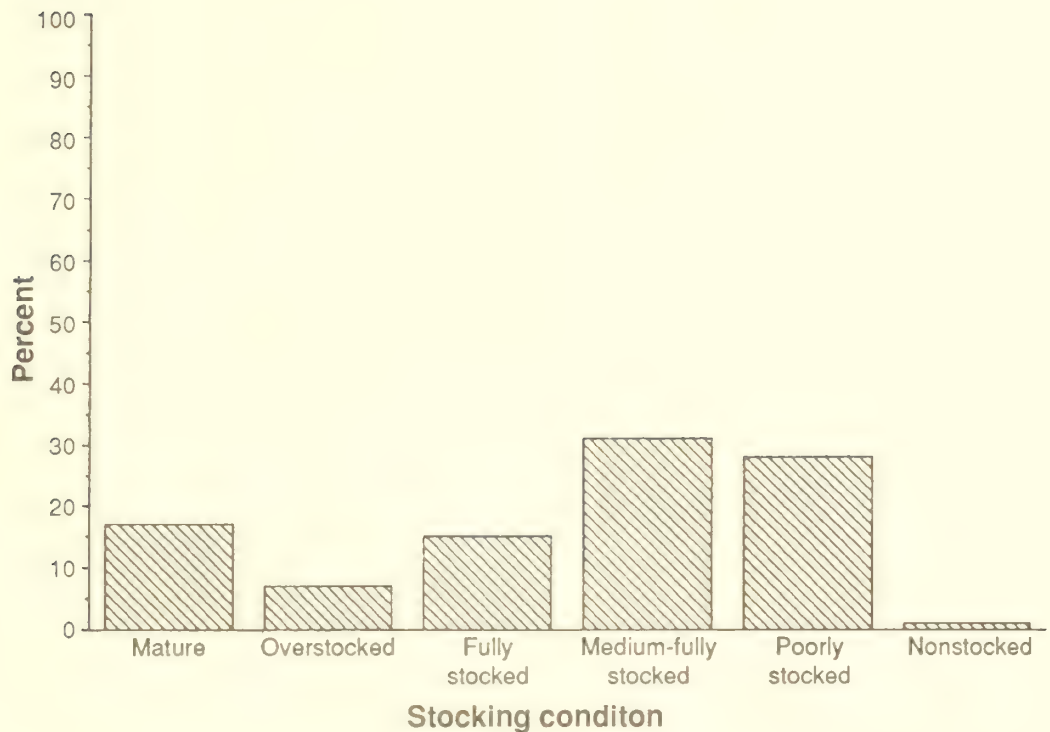


Figure 8—Distribution of timberland area outside National Forests by stocking condition in northwestern Montana, 1989.

4,111 board feet per acre—compared with 4,484 board feet per acre for non-industrial private and 7,745 board feet per acre for other public timberland.

Growing-stock volume is well distributed. About 28 percent is in pole-timber trees, 46 percent is in sawtimber trees under 17.0 inches d.b.h., and trees 17.0 inches d.b.h. and larger account for the remaining 26 percent (fig. 9).

Douglas-fir, ponderosa pine (*Pinus ponderosa*), western larch (*Larix occidentalis*), and lodgepole pine account for three-quarters of the growing-stock and sawtimber volume (fig. 10). Douglas-fir alone accounts for 1.2 billion cubic feet or 40 percent of the inventory. Only lodgepole pine has the bulk of its volume in poletimber stands.

Components of Change

Annual growth increased growing-stock inventory by 108 million cubic feet in 1988, but mortality reduced the gain in cubic foot volume to a net of about 78 million. Lodgepole pine, which incurred severe losses from insect infestation, accounted for 60 percent of the mortality (fig. 11) and showed a net loss in annual growth of more than 2.7 million cubic feet. More than half of the mortality occurred on forest industry land.

Forest land in northwestern Montana is relatively productive with the average acre capable of producing 73 cubic feet of wood per acre per year. Actual gross growth per acre was 57 cubic feet. Net growth averaged about 41 cubic feet per acre in 1988, or 56 percent of potential.

Productive potential is highest for other public timberland with an average of about 77 cubic feet per acre annually, and lowest for forest industry lands—68 cubic feet per acre. Actual net annual growth on nonindustrial private timberland comes closest to potential productivity. These acres are currently averaging nearly 52 cubic feet annually, 68 percent of the potential 76 cubic feet per acre. Forest industry timberlands are presently

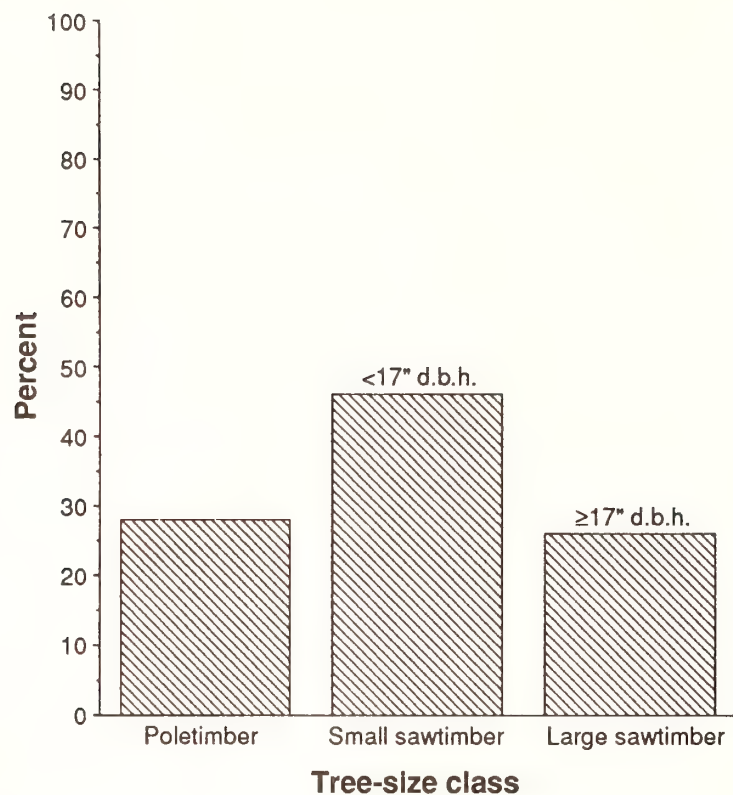


Figure 9—Distribution of growing-stock volume on timberland outside National Forests by tree-size class in northwestern Montana, 1989.

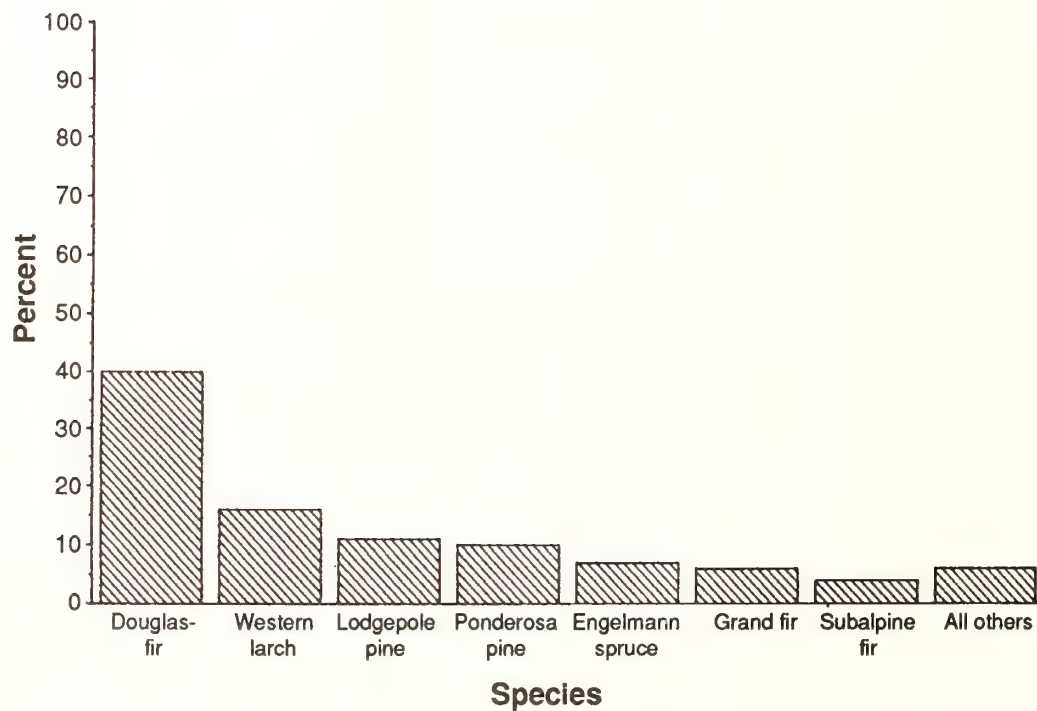


Figure 10—Distribution of growing-stock volume on timberland outside National Forests by species in northwestern Montana, 1989.

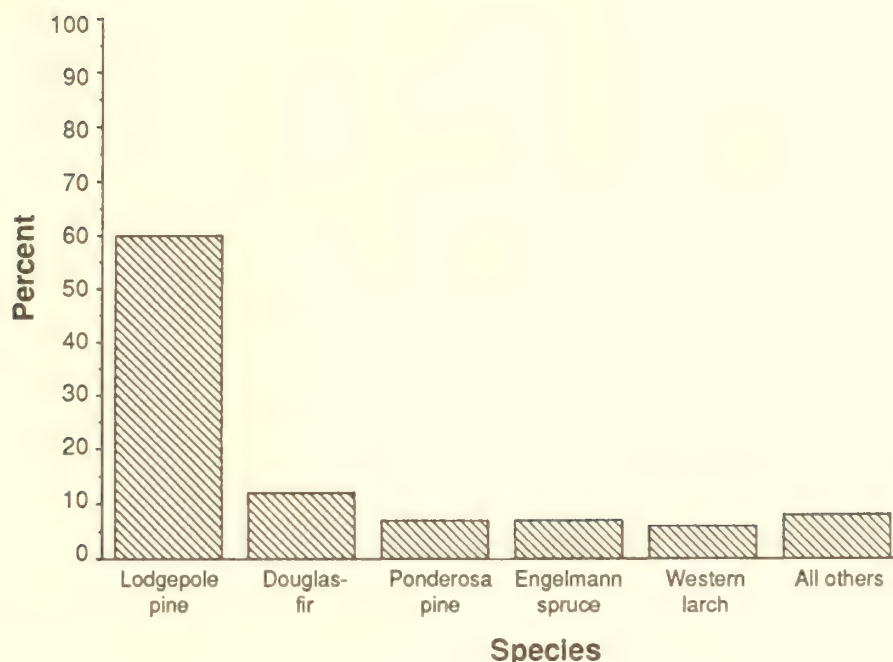


Figure 11—Annual mortality of growing stock on timberland outside National Forests by species in northwestern Montana, 1988.

producing less than 30 cubic feet of wood per acre annually, only 44 percent of potential net growth for the acres in this owner group.

HOW THE INVENTORY WAS CONDUCTED

The inventory was designed to provide reliable statistics primarily at the State and Survey Unit levels.

Prefield

Initial area estimates were based on the classification of 16,128 sample points systematically placed on the latest aerial photographs available. The sample points were summarized and grouped into strata for subsequent field sampling. The photo points, adjusted to meet known land areas, were used to compute area expansion factors for the sampling strata means.

Field

Land classification and estimates for timberland characteristics and volume were based on observations and measurements recorded at 588 field sample locations, of which 409 were forested (fig. 12).

Sample trees for timberland were selected using a 10-point cluster. Trees less than 5.0 inches d.b.h. were measured on a $\frac{1}{300}$ -acre fixed radius plot. Trees 5.0 inches d.b.h. or larger were selected using a variable radius plot. Locations were measured using a 40-basal-area-factor angle gauge.

Compilation

The photo and field data are encoded for subsequent computer manipulation to assure accuracy and consistency of codes and to produce quality control summaries. Final estimates from these data were based on statistical summaries, a portion of which is included in this bulletin. Volume and defect were computed using the most appropriate equations, including those developed by Kemp (1958) and Moisen (1990).

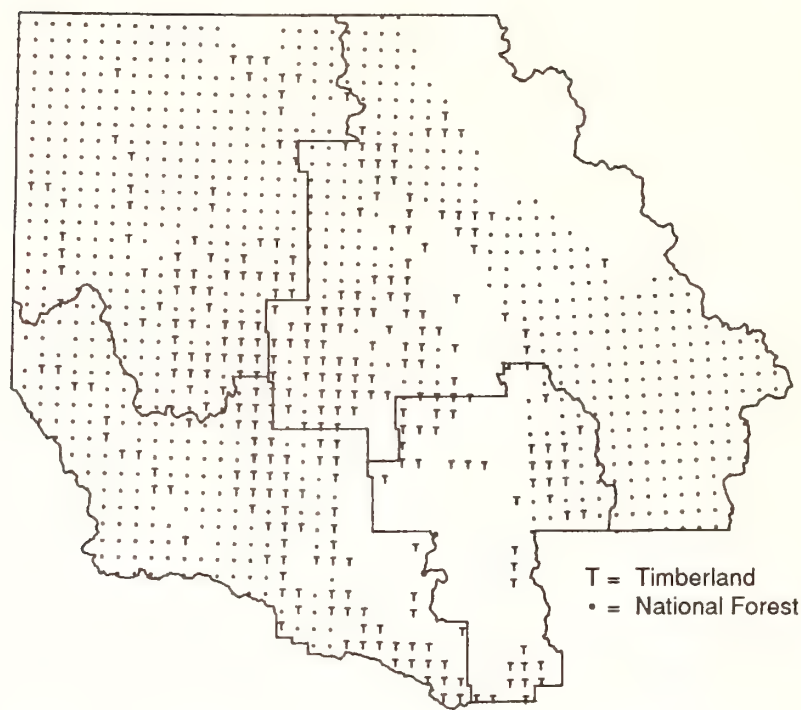


Figure 12—Distribution of timberland field locations outside National Forests in northwestern Montana, 1989.

DATA RELIABILITY

Individual cells within tables should be used with caution. Some are based on small sample sizes, which may result in high sampling errors. The standard error percentages shown in tables 2 and 3 were calculated at the 67 percent confidence level.

STANDARD FOREST SURVEY TERMINOLOGY

Basal area—The cross-sectional area of a tree expressed in square feet. For timber species the calculation is based on diameter at breast height (d.b.h.); for woodland species it is based on diameter at root collar (d.r.c.).

Christmas tree grade—Pinyon species are classified as Christmas trees using the following guidelines:

- Premium—Excellent conical form with no gaps in branches and a straight bole.
- Standard—Good conical form with small gaps in branches and bole slightly malformed.
- Utility—Conical in form with branches missing and bole bent or malformed.
- Cull—Not meeting one of the above classifications or over 12 feet in height.

Cord—A pile of stacked wood equivalent to 128 cubic feet of wood and air space having standard dimensions of 4 by 4 by 8 feet.

Cull trees—Live trees that are unmerchantable now or prospectively (see Rough trees and Rotten trees).

Cull volume—Portions of a tree's volume that are not usable for wood products because of rot, missing or dead material, or other cubic-foot defect.

Deferred forest land—Forest lands within the National Forest System that are under study for possible inclusion in the Wilderness System.

Diameter at breast height (d.b.h.)—Diameter of the stem measured at 4.5 feet above the ground.

Diameter at root collar (d.r.c.)—Diameter equivalent at the point nearest the ground line that represents the basal area of the tree stem or stems.

Diameter classes—Tree diameters, either d.b.h. or d.r.c., grouped into 2-inch classes.

Farmer/rancher-owned lands—Lands owned by a person who operates a farm or a ranch and who either does the work or directly supervises the work.

Fenceposts—Juniper and oak species are evaluated for post potential using the following criteria:

Line post—A 7-foot minimum length with 5 to 7 inches diameter at the butt, 2.5 inches minimum small end diameter, and reasonably straight and solid.

Corner post—An 8-foot minimum length with 7 to 9 inches diameter at the butt, 2.5 inches minimum small end diameter, and reasonably straight and solid.

Forest industry lands—Lands owned by companies or individuals operating a primary wood-processing plant.

Forest lands—Lands at least 10 percent stocked by forest trees of any size, including lands that formerly had such tree cover and that will be naturally or artificially regenerated. The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width at least 120 feet wide to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if less than 120 feet wide.

Forest trees—Woody plants having a well-developed stem or stems, usually more than 12 feet in height at maturity, with a generally well-defined crown.

Forest type—A classification of forest land based upon and named for the tree species presently forming a plurality of live-tree stocking.

Gross annual growth—The average annual increase in the net volume of trees during a specified period.

Growing-stock trees—Live sawtimber trees, poletimber trees, saplings, and seedlings of timber species meeting specified standards of quality and vigor; excludes cull trees.

Growing-stock volume—Net cubic-foot volume in live poletimber-size and sawtimber-size growing-stock trees from a 1-foot stump to a minimum 4-inch top (of central stem) outside bark or to the point where the central stem breaks into limbs.

Growth—See definition for Net annual growth.

Hardwood trees—Trees that are usually broad-leaved and deciduous.

Indian lands—Indian lands held in trust by the Federal Government.

Industrial wood—All commercial roundwood products except fuelwood.

Land area—The area of dry land and land temporarily or partially covered by water such as marshes, swamps, and river flood plains, streams, sloughs, estuaries, and canals less than 120 feet wide; and lakes, reservoirs, and ponds less than 1 acre in size.

Logging residue—The unused portions of growing-stock trees cut or killed by logging.

Miscellaneous Federal lands—Lands administered by Federal agencies other than the Forest Service, U.S. Department of Agriculture, or Bureau of Land Management, U.S. Department of the Interior.

Mortality—The net volume of growing-stock trees that have died from natural causes during a specified period.

National Forest lands—Public lands administered by the Forest Service, U.S. Department of Agriculture.

National Resource lands—Public lands administered by the Bureau of Land Management, U.S. Department of the Interior.

Net annual growth—Gross annual growth minus average annual mortality.

Net dead volume—Total net volume of dead trees plus the net volume of dead material in live trees.

Net volume in board feet—The gross board-foot volume in the sawlog portion of growing-stock trees, less deductions for cull volume.

Net volume in cubic feet—Gross cubic-foot volume in the merchantable portion of trees less deductions for cull volume. For timber species, volume is computed for the merchantable stem from a 1-foot stump to a minimum 4-inch top diameter outside bark (d.o.b.), or to the point where the central stem breaks into limbs. For woodland species, volume is computed outside bark (o.b.) for all woody material above d.r.c. that is larger than 1.5 inches d.o.b.

Nonforest lands—Lands that do not currently qualify as forest land.

Nonindustrial private—All private ownerships except forest industry.

Nonstocked areas—Forest land less than 10 percent stocked with live trees.

Other private lands—Privately owned lands other than forest industry or Indian Trust.

Other public lands—Public lands administered by agencies other than the Forest Service, U.S. Department of Agriculture.

Other removals—The net volume of growing-stock trees removed from the inventory by cultural operations such as timber-stand improvement, by land clearing, and by changes in land use, such as a shift to wilderness.

Poletimber stands—Stands at least 10 percent stocked with growing-stock trees, in which half or more of the stocking is sawtimber or poletimber trees or both, with poletimber stocking exceeding that of sawtimber (see definition for Stocking).

Poletimber trees—Live trees of timber species at least 5 inches d.b.h. but smaller than sawtimber size.

Potential growth—The average net annual cubic-foot growth per acre at culmination of mean annual growth attainable in fully stocked natural stands.

Primary wood-processing plants—Plants using roundwood products such as sawlogs, pulpwood bolts, veneer logs, and so forth.

Productivity class—A classification of forest land that reflects biological potential. For timberlands the index used is the potential net annual growth at culmination of mean annual increment in fully stocked natural stands. For woodland, characteristics that affect the land's ability to produce wood, such as soil depth and aspect, are used. Furthermore, woodland is classified as high site where sustained wood production is likely, or low site where the continuous production of wood is unlikely.

Removals—The net volume of growing-stock trees removed from the inventory by harvesting, cultural operations, land clearings, or changes in land use.

Reserved forest land—Forest land withdrawn from tree utilization through statute or administrative designation.

Residues:

Coarse residues—Plant residues suitable for chipping, such as slabs, edgings, and ends.

Fine residues—Plant residues not suitable for chipping, such as sawdust, shavings, and veneer clippings.

Plant residues—Wood materials from primary manufacturing plants that are not used for any product.

Rotten trees—Live poletimber or sawtimber trees with more than 67 percent of their total volume cull (cubic-foot) and with more than half of the cull volume attributable to rotten or missing material.

Rough trees—Live poletimber or sawtimber trees with more than 67 percent of their total volume cull (cubic-foot) and with less than half of the cull volume attributable to rotten or missing material.

Roundwood—Logs, bolts, or other round sections cut from trees.

Salvable dead trees—Standing dead trees that are currently merchantable by regional standards.

Saplings—Live trees of timber species 1 to 4.9 inches d.b.h. or woodland species 1 to 2.9 inches d.r.c.

Sapling and seedling stands—Timberland stands at least 10 percent stocked on which more than half of the stocking is saplings or seedlings or both.

Sawlog portion—That part of the bole of sawtimber trees between a 1-foot stump and the sawlog top.

Sawlog top—The point on the bole of sawtimber trees above which a sawlog cannot be produced. The minimum sawlog top is 7 inches d.o.b. for softwoods and 9 inches d.o.b. for hardwoods.

Sawtimber stands—Stands at least 10 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Sawtimber trees—Live trees of timber species meeting regional size and defect specifications. Softwood trees must be at least 9 inches d.b.h. and hardwood trees 11 inches d.b.h.

Sawtimber volume—Net volume in board feet of the sawlog portion of live sawtimber trees.

Seedlings—Established live trees of timber species less than 1 inch d.b.h. or woodland species less than 1 inch d.r.c.

Softwood trees—Coniferous trees that are usually evergreen and have needle or scalelike leaves.

Standard error—An expression of the degree of confidence that can be placed on an estimated total or average obtained by statistical sampling methods. Standard errors do not include technique errors that could occur in photo classification of areas, field measurements, or compilation of data.

Stand-size classes—A classification of forest land based on the predominant size of trees present (see Sawtimber stands, Poletimber stands, and Sapling and seedling stands).

State, county, and municipal lands—Lands administered by States, counties, and local public agencies, or lands leased by these governmental units for more than 50 years.

Stocking—An expression of the extent to which growing space is effectively utilized by present or potential growing-stock trees of timber species.

Stocking condition—A categorization of timberland reflecting the degree to which the site is being utilized by growing-stock trees and other conditions affecting current and prospective timber growth (see Stocking):

Overstocked—Areas at least 60 percent stocked with growing-stock trees, but overstocked with all live trees.

Fully stocked—Areas at least 60 percent stocked with growing-stock trees and not overstocked.

Medium to fully stocked—Areas 35 percent to 60 percent stocked with growing-stock trees. Includes areas where other trees or inhibiting vegetation or surface conditions prevent occupancy by growing-stock trees.

Poorly stocked—Areas less than 35 percent stocked with growing-stock trees.

Nonstocked—Forest land less than 10 percent stocked with growing-stock trees.

Mature—Stands of timber species over 100 years old.

Timberland—Forest land where timber species make up at least 10 percent stocking.

Timber species—Tree species traditionally used for industrial wood products. In the Rocky Mountain States, these include aspen and cottonwood hardwood species and all softwood species except pinyon and juniper.

Timber stand improvement—Treatments such as thinning, pruning, release cutting, girdling, weeding, or poisoning of unwanted trees aimed at improving growing conditions for the remaining trees.

Upper-stem portion—That part of the main stem or fork of sawtimber trees above the sawlog top to a minimum top diameter of 4 inches outside bark or to the point where the main stem or fork breaks into limbs.

Water—Streams, sloughs, estuaries, and canals more than 120 feet wide, and lakes, reservoirs, and ponds more than 1 acre in size at mean high water level.

Wilderness—An area of undeveloped land currently included in the Wilderness System, managed so as to preserve its natural conditions and retain its primeval character and influence.

Woodland—Forest land where timber species make up less than 10 percent stocking.

Woodland species—Tree species not usually converted into industrial wood products. Common uses are fuelwood, fenceposts, and Christmas trees.

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FOREST SURVEY TABLES

Table 1—Total area by ownership class and land class in northwestern Montana, 1989

Ownership class	Land class											
	Nonreserved				Reserved				Total			
	Timberland	Woodland	Nonforest	Total	Timberland	Woodland	Nonforest	Total	Timberland	Woodland	Nonforest	Total
----- Acres -----												
Land:												
Public:												
National Forest	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	4,615,308
Other public:												
Bureau of Land Management	16	—	3	19	—	—	—	—	16	—	—	19
National Parks ²	—	—	—	—	453,825	—	189,312	643,137	453,825	—	189,312	643,137
Miscellaneous Federal	5,741	—	26,184	31,925	—	—	—	—	5,741	—	26,184	31,925
State	286,360	—	34,889	321,249	2,478	—	—	2,478	288,838	—	34,889	323,727
County and municipal	326	—	341	667	—	—	—	—	326	—	341	667
Total other public	292,443	—	61,417	353,860	456,303	—	189,312	645,615	748,746	—	250,729	999,475
Total public	292,443	—	61,417	353,860	456,303	—	189,312	645,615	748,746	—	250,729	5,614,783
Private:												
Indian Trust	309,716	—	145,590	455,306	41,898	—	36,195	78,093	351,614	—	181,785	533,399
Forest industry	806,272	—	36,415	842,687	—	—	—	—	806,272	—	36,415	842,687
Other private	506,981	—	796,885	1,303,866	630	—	—	630	507,611	—	796,885	1,304,496
Total private	1,622,969	—	978,890	2,601,859	42,528	—	36,195	78,723	1,665,497	—	1,015,085	2,680,582
Total land area	1,915,412	—	1,040,307	2,955,719	498,831	—	225,507	724,338	2,414,243	—	1,265,814	8,295,365
Water												
Total land and water ³	1,915,412	—	1,040,307	2,955,719	498,831	—	225,507	724,338	2,414,243	—	1,265,814	8,528,780

¹ Data not available for this report.

2 Not included with miscellaneous Federal, a component of other public, for purpose of clarity. These lands are reserved and are included in tables 1, 2, and 4 only.

³ U.S. Department of Commerce, Bureau of Census 1980.

Table 2—Area of forest land outside National Forests with percent standard error in northwestern Montana, 1989

Item	Acres	Percent standard error
Timberland	1,915,412	±1.7
Woodland	—	±0.0
Reserved forest land: ¹		
Timberland	498,831	
Woodland	—	
Total forest land ²	2,414,243	

¹Reserved land areas are estimated from aerial photos without field verification; therefore, standard errors are not calculated.

²On this and all following tables, totals may vary due to rounding.

Table 3—Net volume, net annual growth, and annual mortality of growing stock and sawtimber on timberland outside National Forests with percent standard error in northwestern Montana

Item	All species	
	Volume	Percent standard error
Net volume, 1989:		
Growing stock (M cubic feet)	2,960,126	±4.8
Sawtimber ¹ (M board feet)	11,060,400	±5.9
Sawtimber ² (M board feet)	9,240,798	±6.1
Net annual growth, 1988:		
Growing stock (M cubic feet)	78,138	±7.2
Sawtimber ¹ (M board feet)	304,855	±7.1
Sawtimber ² (M board feet)	264,687	±6.9
Annual mortality, 1988:		
Growing stock (M cubic feet)	30,192	±12.3
Sawtimber ¹ (M board feet)	82,701	±13.1
Sawtimber ² (M board feet)	69,449	±13.2

¹International ¼-inch rule.

²Scribner rule.

Table 4—Total land area outside National Forests by major land class and owner group in northwestern Montana, 1989

Land class	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Acres -----						
Timberland:						
Reserved	2,478	453,825	456,303	—	42,528	498,831
Nonreserved	286,360	6,083	292,443	806,272	816,697	1,915,412
Total	288,838	459,908	748,746	806,272	859,225	2,414,243
Woodland:						
Reserved	—	—	—	—	—	—
Nonreserved	—	—	—	—	—	—
Total	—	—	—	—	—	—
Total forest land:						
Reserved	2,478	453,825	456,303	—	42,528	498,831
Nonreserved	286,360	6,083	292,443	806,272	816,697	1,915,412
Total	288,838	459,908	748,746	806,272	859,225	2,414,243
Nonforest land	34,889	215,840	250,729	36,415	978,670	1,265,814
Total land area	323,727	675,748	999,475	842,687	1,837,895	3,680,057

TIMBERLAND TABLES

Area

Table 5—Area of timberland outside National Forests by forest type, stand-size class, and productivity class in northwestern Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	32,375	197,832	309,606	70,175	609,988
Poletimber	—	—	6,111	121,592	61,170	188,873
Sapling and seedling	—	6,111	5,751	103,216	65,853	180,931
Nonstocked	—	—	—	—	14,039	14,039
Total	—	38,486	209,694	534,414	211,237	993,831
Western hemlock:						
Sawtimber	—	—	6,409	—	—	6,409
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	6,112	—	6,112
Nonstocked	—	—	—	—	—	—
Total	—	—	6,409	6,112	—	12,521
Ponderosa pine:						
Sawtimber	2,039	8,224	19,610	71,919	9,504	111,296
Poletimber	—	—	—	10,863	—	10,863
Sapling and seedling	—	—	—	28,436	11,862	40,298
Nonstocked	—	—	—	6,112	—	6,112
Total	2,039	8,224	19,610	117,330	21,366	168,569
Western white pine:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
						(con.)

(con.)

Table 5—(Con.)

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Lodgepole pine:						
Sawtimber	—	—	1,723	18,188	15,958	35,869
Poletimber	—	11,111	15,968	70,132	37,916	135,127
Sapling and seedling	—	—	—	33,262	17,309	50,571
Nonstocked	—	—	6,408	—	—	6,408
Total	—	11,111	24,099	121,582	71,183	227,975
Western larch:						
Sawtimber	—	—	39,833	47,675	—	87,508
Poletimber	—	—	—	16,953	—	16,953
Sapling and seedling	—	—	—	46,719	10,790	57,509
Nonstocked	—	—	—	—	—	—
Total	—	—	39,833	111,347	10,790	161,970
Western redcedar:						
Sawtimber	—	—	12,521	4,702	—	17,223
Poletimber	—	—	—	6,409	—	6,409
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	12,521	11,111	—	23,632
Grand fir:						
Sawtimber	—	16,366	13,871	32,642	—	62,879
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	21,954	10,864	—	32,818
Nonstocked	—	—	—	12,676	—	12,676
Total	—	16,366	35,825	56,182	—	108,373
Spruce-fir:						
Sawtimber	—	—	45,461	17,719	5,262	68,442
Poletimber	—	—	—	21,025	1,723	22,748
Sapling and seedling	—	—	—	15,089	3,632	18,721
Nonstocked	—	—	—	—	—	—
Total	—	—	45,461	53,833	10,617	109,911
Engelmann spruce:						
Sawtimber	—	—	22,794	11,526	—	34,320
Poletimber	—	—	5,751	—	—	5,751
Sapling and seedling	—	—	—	6,037	—	6,037
Nonstocked	—	—	—	—	—	—
Total	—	—	28,545	17,563	—	46,108
Aspen:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	8,760	—	—	8,760
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	8,760	—	—	8,760
Cottonwood: ¹						
Sawtimber	—	—	1,723	1,723	—	3,446
Poletimber	—	8,439	8,438	16,877	—	33,754
Sapling and seedling	—	—	—	8,439	—	8,439
Nonstocked	—	—	—	8,123	—	8,123
Total	—	8,439	10,161	35,162	—	53,762
All types:						
Sawtimber	2,039	56,965	361,777	515,700	100,899	1,037,380
Poletimber	—	19,550	45,028	263,851	100,809	429,238
Sapling and seedling	—	6,111	27,705	258,174	109,446	401,436
Nonstocked	—	—	6,408	26,911	14,039	47,358
Total	2,039	82,626	440,918	1,064,636	325,193	1,915,412

¹Includes paper birch.

Table 6—Area of other publicly owned timberland by forest type, stand-size class, and productivity class in northwestern Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	5,437	44,562	41,932	4,019	95,950
Poletimber	—	—	—	15,043	2,421	17,464
Sapling and seedling	—	—	—	12,656	3,446	16,102
Nonstocked	—	—	—	—	1,816	1,816
Total	—	5,437	44,562	69,631	11,702	131,332
Western hemlock:						
Sawtimber	—	—	135	—	—	135
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	135	—	—	135
Ponderosa pine:						
Sawtimber	2,039	1,951	2,310	2,445	—	8,745
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	2,039	1,951	2,310	2,445	—	8,745
Western white pine:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
Lodgepole pine:						
Sawtimber	—	—	1,723	6,113	3,780	11,616
Poletimber	—	2,433	3,582	9,042	1,752	16,809
Sapling and seedling	—	—	—	1,723	5,447	7,170
Nonstocked	—	—	135	—	—	135
Total	—	2,433	5,440	16,878	10,979	35,730
Western larch:						
Sawtimber	—	—	9,964	24,306	—	34,270
Poletimber	—	—	—	3,791	—	3,791
Sapling and seedling	—	—	—	5,932	2,380	8,312
Nonstocked	—	—	—	—	—	—
Total	—	—	9,964	34,029	2,380	46,373
Western redcedar:						
Sawtimber	—	—	135	4,702	—	4,837
Poletimber	—	—	—	135	—	135
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	135	4,837	—	4,972
Grand fir:						
Sawtimber	—	1,844	1,723	5,426	—	8,993
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	2,351	—	—	2,351
Nonstocked	—	—	—	—	—	—
Total	—	1,844	4,074	5,426	—	11,344
Spruce-fir:						
Sawtimber	—	—	12,772	12,967	5,262	31,001
Poletimber	—	—	—	1,752	1,723	3,475
Sapling and seedling	—	—	—	3,446	3,632	7,078
Nonstocked	—	—	—	—	—	—
Total	—	—	12,772	18,165	10,617	41,554
Engelmann spruce:						
Sawtimber	—	—	2,380	6,131	—	8,511
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	2,380	6,131	—	8,511 (con.)

Table 6—(Con.)

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Aspen:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	82	—	—	82
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	82	—	—	82
Cottonwood: ¹						
Sawtimber	—	—	1,723	1,723	—	3,446
Poletimber	—	29	29	57	—	115
Sapling and seedling	—	—	—	29	—	29
Nonstocked	—	—	—	75	—	75
Total	—	29	1,752	1,884	—	3,665
All types:						
Sawtimber	2,039	9,232	77,427	105,745	13,061	207,504
Poletimber	—	2,462	3,693	29,820	5,896	41,871
Sapling and seedling	—	—	2,351	23,786	14,905	41,042
Nonstocked	—	—	135	75	1,816	2,026
Total	2,039	11,694	83,606	159,426	35,678	292,443

¹Includes paper birch.

Table 7—Area of forest industry owned timberland by forest type, stand-size class, and productivity class in northwestern Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	12,223	48,120	134,798	34,646	229,787
Poletimber	—	—	6,111	36,181	29,114	71,406
Sapling and seedling	—	6,111	5,751	63,037	62,407	137,306
Nonstocked	—	—	—	—	12,223	12,223
Total	—	18,334	59,982	234,016	138,390	450,722
Western hemlock:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	6,112	—	6,112
Nonstocked	—	—	—	—	—	—
Total	—	—	—	6,112	—	6,112
Ponderosa pine:						
Sawtimber	—	—	—	18,284	—	18,284
Poletimber	—	—	—	6,111	—	6,111
Sapling and seedling	—	—	—	12,894	11,862	24,756
Nonstocked	—	—	—	6,112	—	6,112
Total	—	—	—	43,401	11,862	55,263
Western white pine:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
Lodgepole pine:						
Sawtimber	—	—	—	—	6,960	6,960
Poletimber	—	—	6,112	30,826	23,002	59,940
Sapling and seedling	—	—	—	31,539	11,862	43,401
Nonstocked	—	—	—	—	—	—
Total	—	—	6,112	62,365	41,824	110,301
Western larch:						
Sawtimber	—	—	25,117	18,151	—	43,268
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	23,724	—	23,724
Nonstocked	—	—	—	—	—	—
Total	—	—	25,117	41,875	—	66,992
Western redcedar:						
Sawtimber	—	—	6,112	—	—	6,112
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	6,112	—	—	6,112
Grand fir:						
Sawtimber	—	6,112	6,111	12,533	—	24,756
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	13,566	6,112	—	19,678
Nonstocked	—	—	—	12,676	—	12,676
Total	—	6,112	19,677	31,321	—	57,110
Spruce-fir:						
Sawtimber	—	—	17,974	—	—	17,974
Poletimber	—	—	—	6,111	—	6,111
Sapling and seedling	—	—	—	11,643	—	11,643
Nonstocked	—	—	—	—	—	—
Total	—	—	17,974	17,754	—	35,728
Engelmann spruce:						
Sawtimber	—	—	12,004	177	—	12,181
Poletimber	—	—	5,751	—	—	5,751
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	17,755	177	—	17,932 (con.)

Table 7—(Con.)

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Aspen:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
Cottonwood: ¹						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
All types:						
Sawtimber	—	18,335	115,438	183,943	41,606	359,322
Poletimber	—	—	17,974	79,229	52,116	149,319
Sapling and seedling	—	6,111	19,317	155,061	86,131	266,620
Nonstocked	—	—	—	18,788	12,223	31,011
Total	—	24,446	152,729	437,021	192,076	806,272

¹Includes paper birch.

Table 8—Area of nonindustrial private timberland by forest type, stand-size class, and productivity class in northwestern Montana, 1989

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Douglas-fir:						
Sawtimber	—	14,715	105,150	132,876	31,510	284,251
Poletimber	—	—	—	70,368	29,635	100,003
Sapling and seedling	—	—	—	27,523	—	27,523
Nonstocked	—	—	—	—	—	—
Total	—	14,715	105,150	230,767	61,145	411,777
Western hemlock:						
Sawtimber	—	—	6,274	—	—	6,274
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	6,274	—	—	6,274
Ponderosa pine:						
Sawtimber	—	6,273	17,300	51,190	9,504	84,267
Poletimber	—	—	—	4,752	—	4,752
Sapling and seedling	—	—	—	15,542	—	15,542
Nonstocked	—	—	—	—	—	—
Total	—	6,273	17,300	71,484	9,504	104,561
Western white pine:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	—	—	—	—
Lodgepole pine:						
Sawtimber	—	—	—	12,075	5,218	17,293
Poletimber	—	8,678	6,274	30,264	13,162	58,378
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	6,273	—	—	6,273
Total	—	8,678	12,547	42,339	18,380	81,944
Western larch:						
Sawtimber	—	—	4,752	5,218	—	9,970
Poletimber	—	—	—	13,162	—	13,162
Sapling and seedling	—	—	—	17,063	8,410	25,473
Nonstocked	—	—	—	—	—	—
Total	—	—	4,752	35,443	8,410	48,605
Western redcedar:						
Sawtimber	—	—	6,274	—	—	6,274
Poletimber	—	—	—	6,274	—	6,274
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	6,274	6,274	—	12,548
Grand fir:						
Sawtimber	—	8,410	6,037	14,683	—	29,130
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	6,037	4,752	—	10,789
Nonstocked	—	—	—	—	—	—
Total	—	8,410	12,074	19,435	—	39,919
Spruce-fir:						
Sawtimber	—	—	14,715	4,752	—	19,467
Poletimber	—	—	—	13,162	—	13,162
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	14,715	17,914	—	32,629
Engelmann spruce:						
Sawtimber	—	—	8,410	5,218	—	13,628
Poletimber	—	—	—	—	—	—
Sapling and seedling	—	—	—	6,037	—	6,037
Nonstocked	—	—	—	—	—	—
Total	—	—	8,410	11,255	—	19,665
						(con.)

(con.)

Table 8—(Con.)

Forest type and stand-size class	Productivity class					Total acres
	165+	120-164	85-119	50-84	20-49	
	----- Acres -----					
Aspen:						
Sawtimber	—	—	—	—	—	—
Poletimber	—	—	8,678	—	—	8,678
Sapling and seedling	—	—	—	—	—	—
Nonstocked	—	—	—	—	—	—
Total	—	—	8,678	—	—	8,678
Cottonwood: ¹						
Sawtimber	—	—	—	—	—	—
Poletimber	—	8,410	8,409	16,820	—	33,639
Sapling and seedling	—	—	—	8,410	—	8,410
Nonstocked	—	—	—	8,048	—	8,048
Total	—	8,410	8,409	33,278	—	50,097
All types:						
Sawtimber	—	29,398	168,912	226,012	46,232	470,554
Poletimber	—	17,088	23,361	154,802	42,797	238,048
Sapling and seedling	—	—	6,037	79,327	8,410	93,774
Nonstocked	—	—	6,273	8,048	—	14,321
Total	—	46,486	204,583	468,189	97,439	816,697

¹Includes paper birch.

Table 9—Area of timberland outside National Forests by stand volume and owner group in northwestern Montana, 1989

Stand volume per acre ¹	Owner group					Total
	Other public		Total other public	Forest industry	Nonindustrial private	
	State	Other				
	----- Acres -----					
Less than 1,500 board feet	45,998	1,826	47,824	314,071	217,205	579,100
1,500 to 4,999 board feet	55,776	2,303	58,079	267,940	264,639	590,658
5,000 to 9,999 board feet	80,235	1,379	81,614	91,119	214,716	387,449
10,000 board feet or more	104,351	575	104,926	133,142	120,137	358,205
All classes	286,360	6,083	292,443	806,272	816,697	1,915,412

¹International 1/4-inch rule.**Table 10**—Area of timberland outside National Forests by forest type and stocking condition in northwestern Montana, 1989

Forest type	Stocking condition						All classes
	Overstocked	Fully stocked	Medium to fully stocked	Poorly stocked	Mature	Nonstocked	
----- Acres -----							
Douglas-fir	25,995	96,078	340,350	331,955	185,415	14,039	993,832
Western hemlock	—	—	12,521	—	—	—	12,521
Ponderosa pine	—	10,864	55,177	72,651	23,766	6,111	168,569
Western white pine	—	—	—	—	—	—	—
Lodgepole pine	53,515	51,228	84,147	25,158	7,520	6,409	227,977
Western larch	15,925	19,719	58,762	23,639	43,923	—	161,968
Western redcedar	—	12,520	6,409	—	4,702	—	23,631
Grand fir	4,167	35,569	29,093	13,192	13,678	12,676	108,375
Spruce-fir	1,816	10,549	40,285	23,091	34,169	—	109,910
Engelmann spruce	8,101	1,723	12,149	14,168	9,967	—	46,108
Aspen	—	—	—	8,760	—	—	8,760
Cottonwood ¹	10,161	25,315	—	10,161	—	8,124	53,761
All types	119,680	263,565	638,893	522,775	323,140	47,359	1,915,412

¹Includes paper birch.

Number of Trees

Table 11—Number of growing-stock trees on timberland outside National Forests by species and diameter class in northwestern Montana, 1989

Species	Diameter class (inches at breast height)															29.0+	All classes
	1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9			
Thousand trees																	
Douglas-fir	133,949	66,315	41,687	26,630	16,451	10,832	5,615	3,865	2,533	1,323	613	307	197	114	64	310,495	
Ponderosa pine	41,472	12,850	5,551	3,835	2,935	1,737	1,491	1,100	514	388	327	171	201	91	202	72,865	
Western white pine	—	—	145	—	142	170	41	70	23	11	11	4	4	2	2	625	
Lodgepole pine	57,772	43,153	32,187	14,853	3,553	1,186	345	61	14	10	—	—	—	—	—	153,134	
Whitebark pine	—	—	34	22	37	43	—	11	4	10	6	—	—	—	—	167	
Western larch	21,017	12,944	13,992	6,899	4,938	2,492	1,720	952	733	597	362	238	176	118	125	67,303	
Grand fir	19,729	13,250	6,961	4,727	1,776	1,490	711	423	155	114	83	37	—	—	—	49,456	
Subalpine fir	35,348	11,456	7,716	3,644	1,834	883	387	143	60	36	—	—	—	2	—	61,509	
Engelmann spruce	15,758	9,245	4,235	4,372	1,879	1,326	805	476	231	126	107	31	27	42	25	38,685	
Western hemlock	2,961	1,222	303	484	194	196	31	22	31	10	10	8	—	—	—	5,472	
Western redcedar	24,710	7,446	2,690	938	808	411	185	52	89	30	6	23	24	14	25	37,451	
Total softwoods	352,716	177,881	115,501	66,404	34,547	20,766	11,331	7,175	4,387	2,655	1,525	819	629	383	443	797,162	
Aspen	6,751	6,751	806	691	493	214	63	26	—	11	—	—	—	—	—	15,806	
Cottonwood ¹	14,393	7,194	3,948	1,564	862	387	117	114	64	15	15	4	—	—	17	28,694	
Total hardwoods	21,144	13,945	4,754	2,255	1,355	601	180	140	64	26	15	4	—	—	17	44,500	
All species	373,860	191,826	120,255	68,659	35,902	21,367	11,511	7,315	4,451	2,681	1,540	823	629	383	460	841,662	

¹Includes paper birch.

Table 12—Number of cull and salvable dead trees on timberland outside National Forests by owner group, and softwoods and hardwoods in northwestern Montana, 1989

Owner group	Species group	Cull trees			Salvable dead trees	Total
		Rough	Rotten	Total		
----- Thousand trees -----						
Other public:						
State:	Softwoods	765	815	1,580	6,574	8,154
	Hardwoods	—	98	98	—	98
	Total	765	913	1,678	6,574	8,252
Other:	Softwoods	13	5	18	32	50
	Hardwoods	—	1	1	—	1
	Total	13	6	19	32	51
Total other public:	Softwoods	778	820	1,598	6,606	8,204
	Hardwoods	—	99	99	—	99
	Total	778	919	1,697	6,606	8,303
Forest industry:						
	Softwoods	682	1,474	2,156	16,959	19,115
	Hardwoods	—	1	1	—	1
	Total	682	1,475	2,157	16,959	19,116
Nonindustrial private:						
	Softwoods	2,487	1,001	3,488	7,075	10,563
	Hardwoods	—	34	34	—	34
	Total	2,487	1,035	3,522	7,075	10,597
Total:						
	Softwoods	3,947	3,295	7,242	30,640	37,882
	Hardwoods	—	134	134	—	134
	Total	3,947	3,429	7,376	30,640	38,016

Volume

Table 13—Net volume of growing stock on timberland outside National Forests by forest type and stand-size class in northwestern Montana, 1989

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
----- Thousand cubic feet -----					
Douglas-fir	1,161,531	216,340	55,253	609	1,433,733
Western hemlock	8,505	—	—	—	8,505
Ponderosa pine	146,270	9,726	8,159	317	164,472
Western white pine	—	—	—	—	—
Lodgepole pine	50,035	266,701	17,492	1,776	336,004
Western larch	246,275	31,351	12,998	—	290,624
Western redcedar	60,676	14,532	—	—	75,208
Grand fir	217,401	—	12,347	—	229,748
Spruce-fir	210,436	27,843	4,122	—	242,401
Engelmann spruce	74,585	12,715	324	—	87,624
Aspen	—	11,346	—	—	11,346
Cottonwood¹	11,899	62,821	4,917	824	80,461
All types	2,187,613	653,375	115,612	3,526	2,960,126

¹Includes paper birch.

Table 14—Net volume of sawtimber (International ¼-inch rule) on timberland outside National Forests by forest type and stand-size class in northwestern Montana, 1989

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
----- Thousand board feet, International 1/4-inch rule -----					
Douglas-fir	5,005,133	429,729	213,445	—	5,648,307
Western hemlock	43,741	—	—	—	43,741
Ponderosa pine	778,881	21,186	38,107	952	839,126
Western white pine	—	—	—	—	—
Lodgepole pine	199,526	312,477	28,221	10,179	550,403
Western larch	1,140,372	50,636	40,016	—	1,231,024
Western redcedar	273,216	19,616	—	—	292,832
Grand fir	847,410	—	36,234	—	883,644
Spruce-fir	968,253	55,901	7,472	—	1,031,626
Engelmann spruce	301,370	31,620	—	—	332,990
Aspen	—	26,367	—	—	26,367
Cottonwood ¹	41,265	129,505	5,668	3,902	180,340
All types	9,599,167	1,077,037	369,163	15,033	11,060,400

¹Includes paper birch.

Table 15—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by forest type and stand-size class in northwestern Montana, 1989

Forest type	Stand-size class				All classes
	Sawtimber	Poletimber	Sapling/ seedling	Nonstocked	
----- Thousand board feet, Scribner rule -----					
Douglas-fir	4,181,215	338,257	176,452	—	4,695,924
Western hemlock	34,151	—	—	—	34,151
Ponderosa pine	649,057	15,621	31,460	848	696,986
Western white pine	—	—	—	—	—
Lodgepole pine	165,556	259,796	23,046	8,533	456,931
Western larch	955,801	39,174	33,806	—	1,028,781
Western redcedar	226,313	15,251	—	—	241,564
Grand fir	718,067	—	28,709	—	746,776
Spruce-fir	833,281	46,791	6,236	—	886,308
Engelmann spruce	255,262	27,104	—	—	282,366
Aspen	—	22,324	—	—	22,324
Cottonwood ¹	33,952	106,732	5,045	2,958	148,687
All types	8,052,655	871,050	304,754	12,339	9,240,798

¹Includes paper birch.

Table 16—Net volume of growing stock on timberland outside National Forests by species and owner group in northwestern Montana, 1989

Species	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand cubic feet -----						
Douglas-fir	229,465	3,097	232,563	451,375	515,692	1,199,630
Ponderosa pine	32,572	1,347	33,920	84,981	174,076	292,977
Western white pine	5,542	28	5,570	8,237	1,959	15,766
Lodgepole pine	53,109	955	54,063	122,746	151,322	328,131
Whitebark pine	3,328	—	3,328	—	—	3,328
Western larch	132,777	795	133,572	205,019	147,227	485,818
Grand fir	39,438	184	39,622	70,890	57,818	168,330
Subalpine fir	52,388	66	52,454	30,357	30,994	113,805
Engelmann spruce	62,093	269	62,362	67,210	70,954	200,526
Western hemlock	709	83	792	10,132	4,014	14,938
Western redcedar	12,024	410	12,434	14,532	19,439	46,405
Total softwoods	623,445	7,234	630,680	1,065,479	1,173,495	2,869,654
Aspen	423	178	600	590	19,014	20,204
Cottonwood ¹	14,769	183	14,952	8,765	46,551	70,268
Total hardwoods	15,192	361	15,552	9,355	65,565	90,472
All species	638,637	7,595	646,232	1,074,834	1,239,060	2,960,126

¹Includes paper birch.

Table 17—Net volume of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and owner group in northwestern Montana, 1989

Species	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand board feet, International 1/4-inch rule -----						
Douglas-fir	959,245	10,994	970,239	1,742,738	1,960,531	4,673,508
Ponderosa pine	182,750	7,690	190,440	447,816	993,227	1,631,483
Western white pine	32,493	129	32,622	47,724	9,639	89,985
Lodgepole pine	104,930	915	105,845	112,907	220,154	438,906
Whitebark pine	16,323	—	16,323	—	—	16,323
Western larch	694,528	2,350	696,878	943,701	566,321	2,206,900
Grand fir	143,718	684	144,402	233,669	203,054	581,125
Subalpine fir	152,572	92	152,664	66,975	57,025	276,664
Engelmann spruce	281,745	721	282,466	268,136	245,183	795,785
Western hemlock	2,930	315	3,245	38,160	14,617	56,022
Western redcedar	51,841	1,034	52,875	46,989	49,816	149,680
Total softwoods	2,623,075	24,924	2,647,999	3,948,815	4,319,567	10,916,381
Aspen	—	339	339	2,709	33,483	36,531
Cottonwood¹	35,878	267	36,145	11,897	59,446	107,488
Total hardwoods	35,878	606	36,484	14,606	92,929	144,019
All species	2,658,953	25,530	2,684,483	3,963,421	4,412,496	11,060,400

¹Includes paper birch.

Table 18—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by species and owner group in northwestern Montana, 1989

Species	Owner group					Total
	Other public			Forest Industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand board feet, Scribner rule -----						
Douglas-fir	811,579	9,110	820,689	1,458,887	1,631,832	3,911,408
Ponderosa pine	155,464	6,404	161,868	372,716	829,473	1,364,057
Western white pine	28,166	107	28,273	40,401	7,770	76,444
Lodgepole pine	87,729	776	88,505	95,202	184,794	368,501
Whitebark pine	14,032	—	14,032	—	—	14,032
Western larch	584,660	1,770	586,430	780,344	453,558	1,820,332
Grand fir	121,207	570	121,777	198,595	168,905	489,277
Subalpine fir	126,454	76	126,530	56,843	47,377	230,750
Engelmann spruce	242,653	602	243,255	227,676	209,047	679,978
Western hemlock	2,364	253	2,617	32,932	11,687	47,236
Western redcedar	41,395	793	42,188	37,841	38,395	118,424
Total softwoods	2,215,703	20,461	2,236,164	3,301,437	3,582,838	9,120,439
Aspen	—	287	287	2,411	28,193	30,891
Cottonwood ¹	28,172	226	28,398	10,390	50,680	89,468
Total hardwoods	28,172	513	28,685	12,801	78,873	120,359
All species	2,243,875	20,974	2,264,849	3,314,238	3,661,711	9,240,798

¹Includes paper birch.

Table 19—Net volume of growing stock on timberland outside National Forests by species and diameter class in northwestern Montana, 1989

Species	Diameter class (inches at breast height)												All classes
	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 22.9	23.0- 24.9	25.0- 26.9	27.0- 28.9	29.0+ classes
Thousand cubic feet													
Douglas-fir	102,067	155,969	179,744	185,474	141,520	136,178	112,114	74,322	41,873	26,065	20,001	13,349	10,953 1,199,629
Ponderosa pine	9,255	17,774	26,657	24,904	32,770	35,452	22,051	20,963	22,003	13,952	21,179	10,790	35,226 292,976
Western white pine	189	—	2,138	3,857	1,277	3,186	1,396	792	943	588	570	460	369 15,765
Lodgepole pine	115,282	121,012	49,593	26,557	11,730	2,384	617	956	—	—	—	—	328,131
Whitebark pine	80	142	265	899	—	473	247	665	557	—	—	—	3,328
Western larch	36,068	47,399	63,670	52,639	50,975	40,280	41,720	39,169	30,204	24,845	19,872	15,729	23,248 485,818
Grand fir	19,789	32,697	23,048	29,338	21,265	15,853	8,144	7,743	7,020	3,434	—	—	168,331
Subalpine fir	30,560	25,205	21,362	16,465	9,789	5,602	2,728	1,970	—	—	—	124	— 113,805
Engelmann spruce	15,153	33,636	25,061	29,255	25,836	21,430	13,033	9,696	9,936	3,353	3,331	5,953	4,853 200,526
Western hemlock	926	2,632	2,270	3,732	734	888	1,255	807	953	741	—	—	14,938
Western redcedar	9,155	5,684	8,618	6,337	3,793	1,452	2,612	1,166	298	1,423	1,773	1,062	3,033 46,406
Total softwoods	338,524	442,150	402,426	379,457	299,689	263,178	205,917	158,249	113,787	74,401	66,726	47,467	77,682 2,869,653
Aspen	2,568	5,182	5,389	3,957	1,664	889	—	555	—	—	—	—	20,204
Cottonwood ¹	19,856	16,211	11,589	7,279	3,075	4,017	2,532	837	912	338	—	—	3,623 70,269
Total hardwoods	22,424	21,393	16,978	11,236	4,739	4,906	2,532	1,392	912	338	—	—	3,623 90,473
All species	360,948	463,543	419,404	390,693	304,428	268,084	208,449	159,641	114,699	74,739	66,726	47,467	81,305 2,960,126

¹Includes paper birch.

Table 20—Net volume of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and diameter class in northwestern Montana, 1989

Species	Diameter class (inches at breast height)												All classes
	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 22.9	23.0- 24.9	25.0- 26.9	27.0- 28.9	29.0+		
----- Thousand board feet, International 1/4-inch rule -----													
Douglas-fir	643,168	874,876	721,321	726,356	619,881	422,347	242,705	153,832	120,310	80,994	67,719	4,673,509	
Ponderosa pine	88,762	112,607	183,288	219,037	144,105	141,361	151,131	97,435	151,537	79,637	262,584	1,631,484	
Western white pine	11,150	21,691	7,346	18,650	8,259	4,748	5,722	3,556	3,625	2,809	2,429	89,985	
Lodgepole pine	202,618	150,590	64,695	12,983	3,347	4,673	—	—	—	—	—	438,906	
Whitebark pine	1,163	5,189	—	2,567	1,254	3,407	2,742	—	—	—	—	16,322	
Western larch	252,997	295,573	290,893	230,647	240,009	231,692	178,952	145,898	117,482	91,408	131,358	2,206,899	
Grand fir	91,299	150,593	115,498	87,460	43,666	39,917	35,403	17,288	—	—	—	581,124	
Subalpine fir	82,783	86,959	51,850	29,688	14,302	10,373	—	—	—	709	—	276,664	
Engelmann spruce	104,218	160,445	140,524	115,037	68,983	51,074	53,450	18,579	19,028	34,980	29,466	795,784	
Western hemlock	8,853	18,222	3,698	4,708	6,602	4,388	5,338	4,213	—	—	—	56,022	
Western redcedar	38,174	31,799	19,094	7,205	12,675	5,545	1,402	6,614	8,202	4,904	14,068	149,682	
Total softwoods	1,525,185	1,908,544	1,598,207	1,454,338	1,163,083	919,525	676,845	447,405	420,184	295,441	507,624	10,916,381	
Aspen	XXXXX	20,666	8,610	4,546	—	2,709	—	—	—	—	—	36,531	
Cottonwood ¹	XXXXX	34,374	15,146	19,991	11,301	3,890	4,173	1,544	—	—	17,069	107,488	
Total hardwoods	XXXXX	55,040	23,756	24,537	11,301	6,599	4,173	1,544	—	—	17,069	144,019	
All species	1,525,185	1,963,584	1,621,963	1,478,875	1,174,384	926,124	681,018	448,949	420,184	295,441	524,693	11,060,400	

¹Includes paper birch.

Table 21—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by species and diameter class in northwestern Montana, 1989

Species	Diameter class (inches at breast height)												All classes
	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 22.9	23.0- 24.9	25.0- 26.9	27.0- 28.9	29.0+		
----- Thousand board feet, Scribner rule -----													
Douglas-fir	500,625	691,887	600,312	620,573	536,533	369,131	216,007	136,910	107,076	72,085	60,270	3,911,409	
Ponderosa pine	57,733	82,739	147,026	182,142	121,840	120,621	129,820	84,294	133,534	70,677	233,631	1,364,057	
Western white pine	8,586	17,756	6,231	16,259	7,301	4,222	5,041	3,165	3,222	2,500	2,162	76,445	
Lodgepole pine	169,563	124,863	55,629	11,331	2,956	4,159	—	—	—	—	—	368,501	
Whitebark pine	920	4,278	—	2,244	1,116	3,032	2,441	—	—	—	—	14,031	
Western larch	189,368	214,193	228,760	191,448	205,458	201,125	157,654	129,606	104,457	81,353	116,909	1,820,331	
Grand fir	72,375	122,040	98,315	75,793	38,449	35,413	31,506	15,387	—	—	—	489,278	
Subalpine fir	67,957	70,932	43,746	25,797	12,527	9,161	—	—	—	631	—	230,751	
Engelmann spruce	86,095	132,074	119,155	99,304	60,079	44,873	47,571	16,536	16,935	31,132	26,225	679,979	
Western hemlock	6,801	14,899	3,091	4,171	5,876	3,905	4,744	3,749	—	—	—	47,236	
Western redcedar	29,165	24,370	14,810	5,618	9,893	4,376	1,144	5,547	6,993	4,193	12,312	118,421	
Total softwoods	1,189,188	1,500,031	1,317,075	1,234,680	1,002,028	800,018	595,928	395,194	372,217	262,571	451,509	9,120,439	
Aspen	XXXXX	17,101	7,395	3,984	—	2,411	—	—	—	—	—	30,891	
Cottonwood ¹	XXXXX	26,420	12,570	17,458	9,279	3,462	3,714	1,374	—	—	15,191	89,468	
Total hardwoods	XXXXX	43,521	19,965	21,442	9,279	5,873	3,714	1,374	—	—	15,191	120,359	
All species	1,189,188	1,543,552	1,337,040	1,256,122	1,011,307	805,891	599,642	396,568	372,217	262,571	466,700	9,240,798	

¹Includes paper birch.

Table 22—Net volume of timber on timberland outside National Forests by class of timber, and softwoods and hardwoods in northwestern Montana, 1989

Class of timber	Softwoods	Hardwoods	Total
----- <i>Thousand cubic feet</i> -----			
Sawtimber trees:			
Sawlog portion	1,842,320	22,791	1,865,111
Upper-stem portion	246,658	6,886	253,544
Total	2,088,978	29,677	2,118,655
Poletimber trees	780,676	60,795	841,471
All growing-stock trees	2,869,654	90,472	2,960,126
Rough cull trees	23,465	—	23,465
Rotten cull trees	19,840	500	20,340
Salvable dead trees	164,793	—	164,793
All timber	3,077,752	90,972	3,168,724

Table 25—Net volume of sawtimber (Scribner rule) on timberland outside National Forests by forest type and species in northwestern Montana, 1989

Forest type	Species															
	Douglas- fir	Ponderosa pine	Western white pine	Lodge- pole pine	White- bark pine	Western larch	Grand fir	Sub- alpine fir	Engel- mann spruce	Western hemlock	Western red- cedar	Total soft- woods	Aspen	Cotton- wood¹	Total hard- woods	All species
----- Thousand board feet, Scribner rule -----																
Douglas-fir	3,171,891	665,200	3,257	69,750	—	569,703	94,744	14,061	100,482	619	536	4,690,243	2,970	2,712	5,682	4,695,925
Western hemlock	—	11,417	—	—	—	8,637	3,717	—	—	5,729	4,650	34,150	—	—	—	34,150
Ponderosa pine	63,179	618,589	—	848	—	12,962	1,409	—	—	—	—	696,987	—	—	—	696,987
Western white pine	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lodgepole pine	103,139	37,497	7,606	166,325	—	110,926	16,375	5,972	4,622	—	4,469	456,931	—	—	—	456,931
Western larch	153,973	16,143	13,145	12,330	—	718,336	27,450	12,986	36,508	12,808	22,691	1,026,370	2,411	—	2,411	1,028,781
Western redcedar	47,994	—	10,286	—	—	46,880	32,555	2,446	16,709	6,711	73,547	237,128	3,186	1,250	4,436	241,564
Grand fir	197,544	10,682	15,925	41,585	—	92,508	292,577	2,813	62,055	18,898	10,269	744,857	—	1,919	1,919	746,776
Spruce-fir	116,471	—	21,733	12,865	14,032	220,882	10,787	187,656	288,997	2,472	426	876,321	—	9,987	9,987	886,308
Engelmann spruce	51,817	1,571	—	22,232	—	23,560	850	4,358	161,532	—	1,834	267,754	—	14,611	14,611	282,365
Aspen	—	—	—	—	—	—	—	—	—	—	—	—	22,324	—	22,324	22,324
Cottonwood¹	5,401	2,958	4,492	42,566	—	15,937	8,813	459	9,073	—	—	89,699	—	58,988	58,988	148,687
All types	3,911,409	1,364,057	76,444	368,501	14,032	1,820,331	489,277	230,751	679,978	47,237	118,422	9,120,440	30,891	89,467	120,358	9,240,798

¹Includes paper birch.

Growth

Table 26—Net annual growth of growing stock on timberland outside National Forests by species and owner group in northwestern Montana, 1988

Species	Owner group					Total
	Other public		Total other public	Forest Industry	Nonindustrial private	
	State	Other				
----- Thousand cubic feet -----						
Douglas-fir	6,456	137	6,593	16,461	18,499	41,553
Ponderosa pine	833	42	875	1,490	4,792	7,157
Western white pine	-187	2	-185	119	94	28
Lodgepole pine	-1,683	37	-1,646	-5,972	4,888	-2,730
Whitebark pine	-711	—	-711	—	—	-711
Western larch	1,913	30	1,943	5,123	3,626	10,692
Grand fir	1,441	12	1,453	2,882	2,350	6,685
Subalpine fir	1,657	5	1,662	1,609	1,760	5,031
Engelmann spruce	1,475	8	1,483	905	1,259	3,647
Western hemlock	19	6	25	364	302	691
Western redcedar	268	24	292	726	1,124	2,142
Total softwoods	11,481	303	11,784	23,707	38,694	74,185
Aspen	12	5	17	10	627	654
Cottonwood¹	428	8	436	111	2,752	3,299
Total hardwoods	440	13	453	121	3,379	3,953
All species	11,921	316	12,237	23,828	42,073	78,138

¹Includes paper birch.

Table 27—Net annual growth of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and owner group in northwestern Montana, 1988

Species	Owner group					Total
	Other public		Total other public	Forest Industry	Nonindustrial private	
	State	Other				
----- Thousand board feet, International 1/4-inch rule -----						
Douglas-fir	26,519	539	27,058	73,192	72,620	172,870
Ponderosa pine	5,279	341	5,620	7,545	33,489	46,654
Western white pine	-1,011	4	-1,007	1,114	314	421
Lodgepole pine	-8,233	58	-8,175	-13,908	4,933	-17,150
Whitebark pine	-3,232	—	-3,232	—	—	-3,232
Western larch	7,507	109	7,616	22,827	13,844	44,287
Grand fir	6,242	39	6,281	7,403	7,276	20,960
Subalpine fir	4,175	8	4,183	4,532	2,892	11,607
Engelmann spruce	4,098	12	4,110	3,504	2,172	9,786
Western hemlock	145	50	195	1,042	2,317	3,554
Western redcedar	648	91	739	2,115	4,252	7,106
Total softwoods	42,137	1,251	43,388	109,366	144,109	296,863
Aspen	—	7	7	36	626	669
Cottonwood ¹	2,485	12	2,497	-390	5,216	7,323
Total hardwoods	2,485	19	2,504	-354	5,842	7,992
All species	44,622	1,270	45,892	109,012	149,951	304,855

¹Includes paper birch.

Table 28—Net annual growth of sawtimber (Scribner rule) on timberland outside National Forests by species and owner group in northwestern Montana, 1988

Species	Owner group					Total
	Other public		Total other public	Forest industry	Nonindustrial private	
	State	Other				
----- Thousand board feet, Scribner rule -----						
Douglas-fir	23,412	468	23,880	61,463	63,283	148,626
Ponderosa pine	4,345	277	4,622	6,189	27,505	38,316
Western white pine	-868	4	-864	1,056	288	480
Lodgepole pine	-6,776	53	-6,723	-11,423	4,708	-13,438
Whitebark pine	-2,744	—	-2,744	—	—	-2,744
Western larch	7,018	96	7,114	20,098	12,211	39,423
Grand fir	5,578	36	5,614	6,584	6,662	18,860
Subalpine fir	3,848	6	3,854	4,073	2,615	10,542
Engelmann spruce	3,753	11	3,764	3,366	2,060	9,190
Western hemlock	133	37	170	952	1,716	2,838
Western redcedar	546	80	626	1,832	3,707	6,165
Total softwoods	38,245	1,068	39,313	94,190	124,755	258,258
Aspen	—	6	6	32	585	623
Cottonwood¹	1,747	10	1,757	-336	4,385	5,806
Total hardwoods	1,747	16	1,763	-304	4,970	6,429
All species	39,992	1,084	41,076	93,886	129,725	264,687

¹Includes paper birch.

Table 29—Net annual growth of growing stock on timberland outside National Forests by species and diameter class in northwestern Montana, 1988

Species	Diameter class (Inches at breast height)														All classes
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+		
Thousand cubic feet															
Douglas-fir	10,494	6,959	7,060	5,678	3,722	3,014	2,407	1,048	438	248	246	125	114	41,553	
Ponderosa pine	900	1,102	1,383	266	731	1,137	389	391	227	79	232	61	260	7,158	
Western white pine	37	-73	35	113	-45	102	-52	18	-31	-26	9	4	-64	27	
Lodgepole pine	4,585	-2,228	-2,263	-1,662	-1,087	-104	19	9	—	—	—	—	—	-2,731	
Whitebark pine	2	-28	-67	-96	-109	-124	-26	-43	-121	-68	-30	—	—	-710	
Western larch	3,026	1,471	2,036	1,308	924	760	230	331	217	103	29	92	166	10,693	
Grand fir	1,933	1,437	800	1,003	571	431	228	90	113	77	—	—	—	6,683	
Subalpine fir	3,303	578	596	261	282	55	-48	4	—	—	—	(1)	—	5,031	
Engelmann spruce	912	1,062	538	723	268	106	-65	-51	58	30	28	23	14	3,646	
Western hemlock	59	181	156	174	19	24	48	16	9	6	—	—	—	692	
Western redcedar	1,222	203	285	171	100	14	53	27	4	21	19	-5	29	2,143	
Total softwoods	26,473	10,664	10,559	7,939	5,376	5,415	3,183	1,840	914	470	533	300	519	74,185	
Aspen	108	256	158	83	23	17	—	8	—	—	—	—	—	653	
Cottonwood ²	1,615	573	604	339	112	129	-96	38	35	8	—	—	-57	3,300	
Total hardwoods	1,723	829	762	422	135	146	-96	46	35	8	—	—	-57	3,953	
All species	28,196	11,493	11,321	8,361	5,511	5,561	3,087	1,886	949	478	533	300	462	78,138	

¹Less than 500 cubic feet.

²Includes paper birch.

Table 30—Net annual growth of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and diameter class in northwestern Montana, 1988

Species	Diameter class (Inches at breast height)												All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+		
Thousand board feet, International 1/4-inch rule													
Douglas-fir	69,984	33,558	22,178	18,172	14,808	6,686	2,804	1,582	1,598	775	725	172,870	
Ponderosa pine	15,560	3,637	6,212	8,518	3,032	2,892	1,724	603	1,896	652	1,928	46,654	
Western white pine	248	719	-260	577	-295	108	-179	-155	60	27	-428	422	
Lodgepole pine	-1,191	-9,503	-6,016	-570	86	45	—	—	—	—	—	-17,149	
Whitebark pine	148	-577	-632	-679	-131	-222	-620	-353	-165	—	—	-3,231	
Western larch	20,605	7,521	5,324	4,434	1,343	1,943	1,254	485	94	448	836	44,287	
Grand fir	6,880	6,199	3,258	2,284	1,103	369	497	370	—	—	—	20,960	
Subalpine fir	8,595	1,464	1,504	280	-266	27	—	—	—	3	—	11,607	
Engelmann spruce	3,673	3,920	1,338	461	-393	-262	373	187	193	190	106	9,786	
Western hemlock	1,835	1,030	110	130	263	90	55	39	—	—	—	3,552	
Western redcedar	4,959	909	498	66	236	131	18	93	85	-25	136	7,106	
Total softwoods	131,296	48,877	33,514	33,673	19,786	11,807	5,926	2,851	3,761	2,070	3,303	296,864	
Aspen	XXXXX	441	111	80	—	36	—	—	—	—	—	668	
Cottonwood ¹	XXXXX	6,611	533	573	-501	162	148	56	—	—	-259	7,323	
Total hardwoods	XXXXX	7,052	644	653	-501	198	148	56	—	—	-259	7,991	
All species	131,296	55,929	34,158	34,326	19,285	12,005	6,074	2,907	3,761	2,070	3,044	304,855	

¹Includes paper birch

Table 31—Net annual growth of sawtimber (Scribner rule) on timberland outside National Forests by species and diameter class in northwestern Montana, 1988

Species	Diameter class (inches at breast height)												All classes
	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 22.9	23.0- 24.9	25.0- 26.9	27.0- 28.9	29.0+		
----- Thousand board feet, Scribner rule -----													
Douglas-fir	55,291	30,566	20,131	16,488	13,406	6,082	2,496	1,408	1,422	690	645	148,625	
Ponderosa pine	10,409	3,501	5,621	7,503	2,695	2,541	1,530	539	1,682	580	1,716	38,317	
Western white pine	242	660	-199	531	-258	99	-155	-138	55	24	-381	480	
Lodgepole pine	-261	-7,665	-5,132	-497	76	40	—	—	—	—	—	-13,439	
Whitebark pine	165	-458	-530	-593	-117	-198	-552	-314	-147	—	—	-2,744	
Western larch	16,957	7,074	5,154	4,140	1,388	1,860	1,174	445	88	399	744	39,423	
Grand fir	5,895	5,720	2,998	2,119	1,016	339	444	330	—	—	—	18,861	
Subalpine fir	7,700	1,389	1,383	266	-227	28	—	—	—	3	—	10,542	
Engelmann spruce	3,388	3,602	1,323	472	-309	-218	332	166	172	169	94	9,191	
Western hemlock	1,275	936	107	119	234	80	52	35	—	—	—	2,838	
Western redcedar	4,398	737	394	52	187	111	16	86	78	-18	123	6,164	
Total softwoods	105,459	46,062	31,250	30,600	18,091	10,764	5,337	2,557	3,350	1,847	2,941	258,258	
Aspen	XXXXX	411	105	75	—	32	—	—	—	—	—	623	
Cottonwood ¹	XXXXX	5,122	484	525	-433	144	132	62	—	—	-230	5,806	
Total hardwoods	XXXXX	5,533	589	600	-433	176	132	62	—	—	-230	6,429	
All species	105,459	51,595	31,839	31,200	17,658	10,940	5,469	2,619	3,350	1,847	2,711	264,687	

¹Includes paper birch.

Mortality

Table 32—Annual mortality of growing stock on timberland outside National Forests by species and owner group in northwestern Montana, 1988

Species	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand cubic feet -----						
Douglas-fir	864	5	869	1,128	1,468	3,465
Ponderosa pine	83	6	89	1,637	458	2,184
Western white pine	278	—	278	123	—	401
Lodgepole pine	4,216	17	4,233	11,426	2,451	18,110
Whitebark pine	736	—	736	—	—	736
Western larch	481	2	483	507	787	1,777
Grand fir	164	1	165	113	178	456
Subalpine fir	295	—	295	300	87	682
Engelmann spruce	382	1	383	1,061	567	2,011
Western hemlock	13	—	13	—	—	13
Western redcedar	20	—	20	—	—	20
Total softwoods	7,532	32	7,564	16,295	5,996	29,855
Aspen	—	1	1	—	50	51
Cottonwood ¹	28	1	29	188	69	286
Total hardwoods	28	2	30	188	119	337
All species	7,560	34	7,594	16,483	6,115	30,192

¹Includes paper birch.

Table 33—Annual mortality of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and owner group in northwestern Montana, 1988

Species	Owner group					Total
	Other public			Forest industry	Nonindustrial private	
	State	Other	Total other public			
----- Thousand board feet, International 1/4-inch rule -----						
Douglas-fir	4,228	11	4,239	3,496	4,951	12,686
Ponderosa pine	406	40	446	7,294	2,417	10,157
Western white pine	1,554	—	1,554	371	—	1,925
Lodgepole pine	10,873	14	10,887	21,053	3,756	35,696
Whitebark pine	3,776	—	3,776	—	—	3,776
Western larch	2,132	5	2,137	1,052	2,888	6,077
Grand fir	656	—	656	595	—	1,251
Subalpine fir	962	—	962	444	—	1,406
Engelmann spruce	1,799	4	1,803	4,036	2,469	8,308
Western hemlock	—	—	—	—	—	—
Western redcedar	91	—	91	—	—	91
Total softwoods	26,477	74	26,551	38,341	16,481	81,373
Aspen	—	—	—	—	—	—
Cottonwood ¹	93	7	100	893	335	1,328
Total hardwoods	93	7	100	893	335	1,328
All species	26,570	81	26,651	39,234	16,816	82,701

¹Includes paper birch.

Table 34—Annual mortality of sawtimber (Scribner rule) on timberland outside National Forests by species and owner group in northwestern Montana, 1988

Species	Owner group					Total
	Other public		Total other public	Forest industry	Nonindustrial private	
	State	Other				
----- Thousand board feet, Scribner rule -----						
Douglas-fir	3,607	9	3,616	2,939	4,142	10,697
Ponderosa pine	350	32	382	5,746	1,957	8,085
Western white pine	1,362	—	1,362	309	—	1,671
Lodgepole pine	9,176	12	9,188	17,845	3,124	30,157
Whitebark pine	3,230	—	3,230	—	—	3,230
Western larch	1,839	4	1,843	913	2,281	5,037
Grand fir	543	—	543	487	—	1,030
Subalpine fir	818	—	818	394	—	1,212
Engelmann spruce	1,552	3	1,555	3,427	2,118	7,100
Western hemlock	—	—	—	—	—	—
Western redcedar	78	—	78	—	—	78
Total softwoods	22,555	60	22,615	32,060	13,622	68,297
Aspen	—	—	—	—	—	—
Cottonwood ¹	56	6	62	794	296	1,152
Total hardwoods	56	6	62	794	296	1,152
All species	22,611	66	22,677	32,854	13,918	69,449

¹Includes paper birch.

Table 35—Annual mortality of growing stock on timberland outside National Forests by species and diameter class in northwestern Montana, 1988

Species	Diameter class (inches at breast height)														All classes	
	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+			
Thousand cubic feet																
Douglas-fir	464	556	204	512	316	355	243	369	209	106	103	27	—	—	3,464	
Ponderosa pine	176	114	218	788	393	56	161	—	131	76	—	70	—	—	2,183	
Western white pine	5	73	24	—	84	—	74	—	48	27	—	—	67	—	402	
Lodgepole pine	4,608	6,144	3,690	2,234	1,283	152	—	—	—	—	—	—	—	—	18,111	
Whitebark pine	—	32	72	102	108	127	28	45	124	68	30	—	—	—	736	
Western larch	362	310	104	89	217	35	328	131	43	81	77	—	—	—	1,777	
Grand fir	—	214	73	58	17	57	—	37	—	—	—	—	—	—	456	
Subalpine fir	151	251	33	81	—	41	103	22	—	—	—	—	—	—	682	
Engelmann spruce	250	180	284	157	359	273	272	145	26	—	—	36	29	29	2,011	
Western hemlock	—	13	—	—	—	—	—	—	—	—	—	—	—	—	13	
Western redcedar	—	—	—	—	—	—	—	—	—	—	—	20	—	—	20	
Total softwoods	6,016	7,887	4,702	4,021	2,777	1,096	1,209	749	581	358	210	153	96	96	29,855	
Aspen	51	—	—	—	—	—	—	—	—	—	—	—	—	—	51	
Cottonwood ¹	—	—	—	—	—	—	154	—	—	14	—	—	118	—	286	
Total hardwoods	51	—	—	—	—	—	154	—	—	14	—	—	118	—	337	
All species	6,067	7,887	4,702	4,021	2,777	1,096	1,363	749	581	372	210	153	214	214	30,192	

¹Includes paper birch.

Table 36—Annual mortality of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and diameter class in northwestern Montana, 1988

Species	Diameter class (inches at breast height)														All classes	
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+					
Thousand board feet, International 1/4-inch rule																
Douglas-fir	742	2,409	1,586	1,895	1,349	2,098	1,205	620	599	182	—	—	—	—	12,685	
Ponderosa pine	682	3,911	2,220	356	1,046	—	901	527	—	515	—	—	—	—	10,158	
Western white pine	102	—	488	—	428	—	290	168	—	—	450	—	—	—	1,926	
Lodgepole pine	15,300	12,574	7,015	807	—	—	—	—	—	—	—	—	—	—	35,696	
Whitebark pine	320	608	631	693	139	231	636	353	165	—	—	—	—	—	3,776	
Western larch	308	512	1,243	183	1,881	794	259	459	438	—	—	—	—	—	6,077	
Grand fir	355	295	97	322	—	182	—	—	—	—	—	—	—	—	1,251	
Subalpine fir	97	426	—	216	551	117	—	—	—	—	—	—	—	—	1,407	
Engelmann spruce	1,282	866	1,953	1,472	1,445	760	143	—	—	211	175	—	—	—	8,307	
Western hemlock	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Western redcedar	—	—	—	—	—	—	—	—	—	90	—	—	—	—	90	
Total softwoods	19,188	21,601	15,233	5,944	6,839	4,182	3,434	2,127	1,202	998	625	—	—	—	81,373	
Aspen	XXXXX	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Cottonwood ¹	XXXXX	—	—	—	727	—	—	43	—	—	558	—	—	—	1,328	
Total hardwoods	XXXXX	—	—	—	727	—	—	43	—	—	558	—	—	—	1,328	
All species	19,188	21,601	15,233	5,944	7,566	4,182	3,434	2,170	1,202	998	1,183	—	—	—	82,701	

¹Includes paper birch.

Table 37—Annual mortality of sawtimber (Scribner rule) on timberland outside National Forests by species and diameter class in northwestern Montana, 1988

Species	Diameter class (inches at breast height)												All classes
	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-24.9	25.0-26.9	27.0-28.9	29.0+		
----- Thousand board feet, Scribner rule -----													
Douglas-fir	568	1,884	1,309	1,613	1,166	1,836	1,072	552	533	162	—	10,695	
Ponderosa pine	418	2,999	1,792	298	889	—	776	455	—	458	—	8,085	
Western white pine	79	—	408	—	380	—	256	149	—	—	400	1,672	
Lodgepole pine	12,896	10,494	6,052	714	—	—	—	—	—	—	—	30,156	
Whitebark pine	252	487	530	605	123	206	566	314	147	—	—	3,230	
Western larch	274	330	959	157	1,609	684	227	409	390	—	—	5,039	
Grand fir	273	235	83	277	—	162	—	—	—	—	—	1,030	
Subalpine fir	86	346	—	188	488	104	—	—	—	—	—	1,212	
Engelmann spruce	1,051	728	1,653	1,274	1,257	666	127	—	—	188	156	7,100	
Western hemlock	—	—	—	—	—	—	—	—	—	—	—	—	
Western redcedar	—	—	—	—	—	—	—	—	—	78	—	78	
Total softwoods	15,897	17,503	12,786	5,126	5,912	3,658	3,024	1,879	1,070	886	556	68,297	
Aspen	XXXXX	—	—	—	—	—	—	—	—	—	—	—	
Cottonwood ¹	XXXXX	—	—	—	629	—	—	26	—	—	497	1,152	
Total hardwoods	XXXXX	—	—	—	629	—	—	26	—	—	497	1,152	
All species	15,897	17,503	12,786	5,126	6,541	3,658	3,024	1,905	1,070	886	1,053	69,449	

¹Includes paper birch.

Table 38—Annual mortality of growing stock on timberland outside National Forests by species and cause of death in northwestern Montana, 1988

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown¹	Logging	
----- Thousand cubic feet -----									
Douglas-fir	559	1,710	61	—	568	—	531	37	3,466
Ponderosa pine	1,172	494	—	—	309	11	103	96	2,185
Western white pine	47	215	—	—	29	—	110	—	401
Lodgepole pine	14,475	2,658	—	—	331	—	458	190	18,112
Whitebark pine	102	300	—	—	18	—	315	—	735
Western larch	655	521	—	—	141	13	311	135	1,776
Grand fir	43	295	—	—	—	—	61	56	455
Subalpine fir	—	420	—	—	107	—	155	—	682
Engelmann spruce	618	475	—	—	715	—	202	—	2,010
Western hemlock	—	—	—	—	13	—	—	—	13
Western redcedar	—	20	—	—	—	—	—	—	20
Total softwoods	17,671	7,108	61	—	2,231	24	2,246	514	29,855
Aspen	—	—	—	—	—	—	51	—	51
Cottonwood²	—	28	—	188	—	—	70	—	286
Total hardwoods	—	28	—	188	—	—	121	—	337
All species	17,671	7,136	61	188	2,231	24	2,367	514	30,192

¹Because many destructive agents often attack trees in concert or in succession, it is often difficult to identify the actual causal agent. When the primary cause of death cannot be precisely determined, it is listed as unknown.

²Includes paper birch.

Table 39—Annual mortality of sawtimber (International 1/4-inch rule) on timberland outside National Forests by species and cause of death in northwestern Montana, 1988

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Logging	
----- Thousand board feet, International 1/4-inch rule -----									
Douglas-fir	2,036	7,644	67	—	1,673	—	1,132	135	12,687
Ponderosa pine	5,203	2,176	—	—	1,818	—	434	526	10,157
Western white pine	278	1,198	—	—	203	—	246	—	1,925
Lodgepole pine	27,748	5,263	—	—	1,000	—	1,297	387	35,695
Whitebark pine	545	1,541	—	—	102	—	1,588	—	3,776
Western larch	1,794	1,962	—	—	816	—	1,100	404	6,076
Grand fir	220	601	—	—	—	—	157	273	1,251
Subalpine fir	—	1,190	—	—	54	—	163	—	1,407
Engelmann spruce	3,082	1,640	—	—	2,642	—	944	—	8,308
Western hemlock	—	—	—	—	—	—	—	—	—
Western redcedar	—	90	—	—	—	—	—	—	90
Total softwoods	40,906	23,305	67	—	8,308	—	7,061	1,725	81,372
Aspen	—	—	—	—	—	—	—	—	—
Cottonwood ¹	—	93	—	893	—	—	343	—	1,329
Total hardwoods	—	93	—	893	—	—	343	—	1,329
All species	40,906	23,398	67	893	8,308	—	7,404	1,725	82,701

¹Includes paper birch.

Table 40—Annual mortality of sawtimber (Scribner rule) on timberland outside National Forests by species and cause of death in northwestern Montana, 1988

Species	Cause of death								Total
	Insects	Disease	Fire	Animal	Weather	Suppression	Unknown	Logging	
----- Thousand board feet, Scribner rule -----									
Douglas-fir	1,770	6,419	40	—	1,426	—	924	117	10,696
Ponderosa pine	4,109	1,661	—	—	1,514	—	346	455	8,085
Western white pine	245	1,026	—	—	181	—	219	—	1,671
Lodgepole pine	23,453	4,422	—	—	843	—	1,110	329	30,157
Whitebark pine	477	1,324	—	—	88	—	1,341	—	3,230
Western larch	1,546	1,558	—	—	694	—	892	347	5,037
Grand fir	177	522	—	—	—	—	122	210	1,031
Subalpine fir	—	1,026	—	—	48	—	138	—	1,212
Engelmann spruce	2,656	1,404	—	—	2,245	—	795	—	7,100
Western hemlock	—	—	—	—	—	—	—	—	—
Western redcedar	—	78	—	—	—	—	—	—	78
Total softwoods	34,433	19,440	40	—	7,039	—	5,887	1,458	68,297
Aspen	—	—	—	—	—	—	—	—	—
Cottonwood¹	—	56	—	794	—	—	302	—	1,152
Total hardwoods	—	56	—	794	—	—	302	—	1,152
All species	34,433	19,496	40	794	7,039	—	6,189	1,458	69,449

¹Includes paper birch.

COUNTY TABLES

Table 41—Area of timberland outside National Forests by county in northwestern Montana, 1989

County	Area
	<i>Acres</i>
Flathead	592,063
Lake	318,367
Lincoln	488,310
Sanders	516,672
Total	1,915,412

Table 42—Net volume of growing stock and sawtimber on timberland outside National Forests by county in northwestern Montana, 1989

County	Growing stock	Sawtimber	
		<i>Thousand board feet International 1/4-inch rule</i>	<i>Thousand board feet Scribner rule</i>
	<i>Thousand cubic feet</i>		
Flathead	937,830	3,356,558	2,793,955
Lake	548,745	2,263,703	1,901,560
Lincoln	731,552	2,731,235	2,298,513
Sanders	741,999	2,708,904	2,246,770
Total	2,960,126	11,060,400	9,240,798

Table 43—Net annual growth of growing stock and sawtimber on timberland outside National Forests by county in northwestern Montana, 1988

County	Growing stock	Sawtimber	
		<i>Thousand board feet International 1/4-inch rule</i>	<i>Thousand board feet Scribner rule</i>
	<i>Thousand cubic feet</i>		
Flathead	28,344	107,686	93,429
Lake	12,815	50,292	43,946
Lincoln	15,993	61,767	55,119
Sanders	20,986	85,110	72,193
Total	78,138	304,855	264,687

Table 44—Annual mortality of growing stock and sawtimber on timberland outside National Forests by county in northwestern Montana, 1988

County	Growing stock	Sawtimber	
		<i>Thousand board feet International 1/4-inch rule</i>	<i>Thousand board feet Scribner rule</i>
	<i>Thousand cubic feet</i>		
Flathead	10,685	26,412	22,045
Lake	3,057	11,700	9,942
Lincoln	11,593	31,426	26,417
Sanders	4,857	13,163	11,045
Total	30,192	82,701	69,449

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Presents land area, timberland area, associated volume, and components of change for the forest lands outside the National Forests in northwestern Montana.

KEYWORDS: forest survey, inventory, volume



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